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UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT

February 2003

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

Figures 55-69 show sounding statistics from the polar orbitting satellite NOAA-17. Figure 55 shows the mean daily number of ATOVS soundings, and figures 56-69 show mean and standard deviation observation-background differences for brightness temperature for selected channels.

Figure		Weighting function peak (hPa)
56	Mean	Surface (HIRS8)
57	SD	Surface (HIRS8)
58	Mean	700 (HIRS15)
59	SD	700 (HIRS15)
60	Mean	500-700 (HIRS11)
61	SD	500-700 (HIRS11)
62	Mean	400 (HIRS4)
63	SD	400 (HIRS4)
64	Mean	700 (AMSUA5)
65	SD	700 (AMSUA5)
66	Mean	300 (AMSUA7)
67	SD	300 (AMSUA7)
68	Mean	100 (AMSUA9)
69	RMS	100 (AMSUA9)

N.B. All satellite sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.
25. December 2002. Included statistics for ATOVS sounding data from NOAA-17.
26. December 2002. Meteosat-7 and Meteosat-5 SATOB winds replaced by higher resolution BUFR-coded winds.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.|bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
	≥ 3 degrees	(sea surface temperature).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
	≥ 5 degrees	(sea surface temperature).
3.PGE	≥ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE							
AMET	P	33	0	100	0.6	-13.8	13.8
DICB	P	34	0	100	0.8	6.3	6.3
ELYJ4	P	40	0	35	1.8	4.0	4.4
KMJL	P	24	0	96	1.9	-4.7	5.1
OYJS2	P	20	0	95	1.8	7.2	7.4
P3YS5	P	55	0	2	1.2	4.4	4.5
UACU	P	39	51	100	4.1	-0.9	4.2
UGGA	P	40	5	20	2.0	-5.4	5.7
UHLE	P	33	0	33	1.4	-8.4	8.5
VTXK	P	29	0	55	1.9	4.7	5.1
V2AW5	P	20	10	85	4.5	-4.0	6.0
XPYM	P	47	0	0	0.9	4.0	4.1
31057	P	1180	16	84	4.8	6.6	8.1
48092	P	82	100	100			
62114	P	36	0	100	0.5	6.3	6.3
62140	P	26	0	27	3.2	-4.1	5.2
62301	P	634	58	100	7.7	4.7	9.0
62414	P	67	0	100	0.5	5.8	5.8
63108	P	113	0	100	0.7	6.0	6.1
WIND SPEED							
BBXX KS0	SPEED	309	0	100	2.2	-5.9	6.3
C6MS4	SPEED	36	0	11	4.3	5.0	6.6
C6RN8	SPEED	36	0	17	3.6	5.1	6.2
DEHY	SPEED	48	2	50	5.4	5.9	8.0
ELXU5	SPEED	24	0	25	3.3	8.6	9.2
ELYB2	SPEED	32	3	6	2.5	5.0	5.6
HP6038	SPEED	202	0	6	3.8	5.5	6.7
KS004	SPEED	151	0	100	1.7	-5.8	6.0
KS006	SPEED	78	0	100	2.1	-6.1	6.4
KS007	SPEED	69	0	0	1.6	-5.8	6.0
KS025	SPEED	156	0	100	2.0	-6.3	6.6
LAIP5	SPEED	33	3	21	4.2	5.3	6.7
MYCF3	SPEED	39	0	10	4.3	5.6	7.0
NSUX	SPEED	24	0	13	4.6	6.3	7.7
OWVI2	SPEED	24	8	100	5.5	13.3	14.4
PFRO	SPEED	27	0	100	5.8	5.3	7.9
P3AT9	SPEED	37	0	5	3.2	-5.6	6.4
UAST	SPEED	85	0	6	3.3	5.3	6.3
UCJU	SPEED	55	0	4	3.7	5.2	6.4
UDUR	SPEED	22	0	0	1.7	-5.2	5.4
VEP717	SPEED	198	1	38	4.7	6.3	7.9
VTXK	SPEED	22	0	55	6.0	5.5	8.2
VVJS	SPEED	22	5	32	5.8	5.4	8.0
V2AW5	SPEED	20	0	100	5.2	5.2	7.4
V2FN	SPEED	25	0	100	4.3	14.4	15.1
WPKD	SPEED	37	0	8	3.9	5.0	6.3
62108	SPEED	484	0	7	4.3	-5.6	7.1
8PNK	SPEED	27	0	7	4.4	6.5	7.8
9MBR8	SPEED	44	2	43	6.1	8.5	10.5
9MET6	SPEED	45	2	56	5.3	5.3	7.5
WIND SPEED							
ZDLP	DIRN.	22	0	0	63.2	33.1	71.4
3ETX6	DIRN.	47	9	0	63.4	30.2	70.3
46029	DIRN.	22	0	0	111.9	57.0	125.6
62131	DIRN.	67	0	0	10.3	31.4	33.0
62144	DIRN.	340	0	0	19.4	32.2	37.6
62414	DIRN.	51	0	0	32.6	-36.5	48.9

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
SEA SURFACE TEMPERATURE							
A8AA4	SST	28	4	100	1.0	7.2	7.2
CG2960	SST	227	76	100	1.6	1.4	2.1
C6MS4	SST	34	3	100	1.1	-3.6	3.8
C6YW	SST	29	10	62	1.2	-4.0	4.2
DACF	SST	332	81	81	0.9	0.4	0.9
DBKV	SST	608	0	66	0.5	3.6	3.7
DGZO	SST	37	32	38	1.7	1.4	2.2
EIQN	SST	591	88	100	0.6	-1.9	2.0
ELKU8	SST	37	19	100	2.9	4.7	5.5
ELOG5	SST	62	3	63	2.7	4.1	4.9
ELTS6	SST	79	18	100	2.6	5.9	6.5
ELWY3	SST	44	0	100	1.0	3.0	3.1
ELXO4	SST	29	0	83	1.0	-3.9	4.0
FGTO	SST	76	100	100			
FNJI	SST	107	0	100	0.4	3.0	3.0
H9RS	SST	44	9	100	3.1	3.6	4.8
JKHH	SST	40	7	100	2.4	3.2	4.0
KHRC	SST	23	0	100	0.9	-3.1	3.3
KRPB	SST	49	0	100	1.4	-3.0	3.3
LAJY4	SST	37	11	100	2.6	6.7	7.2
PDYX	SST	33	0	100	0.7	-4.0	4.0
P3ET9	SST	21	0	43	2.2	3.8	4.4
SGAK	SST	26	0	31	1.3	3.3	3.6
SIWB	SST	93	0	37	1.0	3.6	3.8
UCPE	SST	20	0	40	2.6	-3.8	4.6
UGMC	SST	20	0	45	2.1	3.1	3.7
VCLM	SST	68	56	100	1.4	1.6	2.2
VGLZ	SST	22	100	100			
VOCJ	SST	160	8	100	1.7	6.4	6.6
VQAI4	SST	22	5	59	2.6	4.5	5.2
V7DP7	SST	31	0	100	0.9	-4.5	4.6
WCW9126	SST	78	95	97	0.3	-1.9	2.0
WGLA	SST	22	9	41	2.3	-3.1	3.9
WWU8	SST	23	100	100			
YJQL3	SST	49	0	100	0.9	-4.3	4.4
ZMFR	SST	131	79	100	3.5	-4.3	5.6
3FMM6	SST	46	0	100	0.4	-3.8	3.8
41008	SST	617	0	100	0.5	-4.5	4.5
42021	SST	586	0	100	0.8	-4.0	4.1
42043	SST	529	0	54	0.9	-3.0	3.2
42044	SST	58	0	100	0.3	-5.4	5.4
44004	SST	615	0	73	1.7	-3.5	3.9
46131	SST	617	100	100			
46146	SST	609	100	100			
46181	SST	617	100	100			
5WDC	SST	27	89	93	3.6	-0.4	3.6
9VVN	SST	31	0	100	1.5	-5.1	5.3

Figure 1. SHIP/SYNOP mean daily count. FEBRUARY 2003
All hours
Global average number of observations in 24 hours = 20239

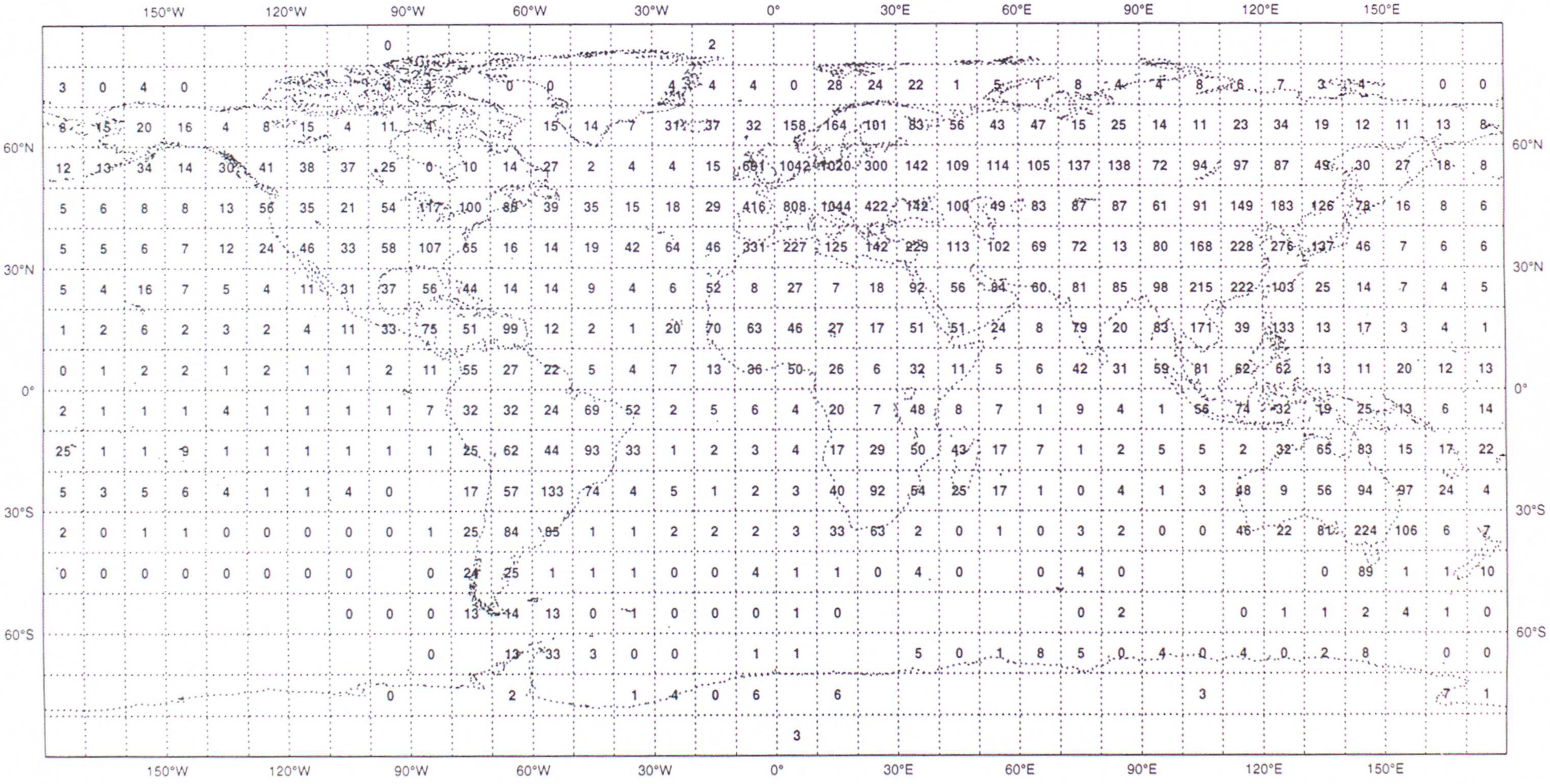

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 2
3 0 4 0 0 0 4 4 4 0 28 24 22 1 5 1 8 4 4 8 6 7 3 4 0 0
8 15 20 16 4 8 15 4 11 4 15 14 7 31 37 32 158 164 101 83 56 43 47 15 25 14 11 23 34 19 12 11 13 8
12 13 34 14 30 41 38 37 25 0 10 14 27 2 4 4 15 681 1042 1020 300 142 109 114 105 137 138 72 94 97 87 49 30 27 18 8
5 6 8 8 13 56 35 21 54 117 100 86 39 35 15 18 29 416 808 1044 422 142 100 49 83 87 87 61 91 149 183 126 78 16 8 6
5 5 6 7 12 24 46 33 58 107 65 16 14 19 42 64 46 331 227 125 142 229 113 102 69 72 13 80 168 228 276 137 46 7 6 6
5 4 16 7 5 4 11 31 37 56 44 14 14 9 4 6 52 8 27 7 18 92 56 84 60 81 85 98 215 222 103 25 14 7 4 5
1 2 6 2 3 2 4 11 33 75 51 99 12 2 1 20 70 63 46 27 17 51 51 24 8 79 20 83 171 39 133 13 17 3 4 1
0 1 2 2 1 2 1 1 2 11 55 27 22 5 4 7 13 36 50 26 6 32 11 5 6 42 31 59 81 62 62 13 11 20 12 13
2 1 1 1 4 1 1 1 1 7 32 32 24 69 52 2 5 6 4 20 7 48 8 7 1 9 4 1 56 74 32 19 25 13 6 14
25 1 1 9 1 1 1 1 1 1 25 62 44 93 33 1 2 3 4 17 29 50 43 17 7 1 2 5 5 2 32 65 83 15 17 22
5 3 5 6 4 1 1 4 0 17 57 133 74 4 5 1 2 3 40 92 54 25 17 1 0 4 1 3 48 9 56 94 97 24 4
2 0 1 1 0 0 0 0 0 1 25 84 85 1 1 2 2 2 3 33 63 2 0 1 0 3 2 0 0 46 22 81 224 106 6 7
0 0 0 0 0 0 0 0 0 24 25 1 1 1 0 0 4 1 1 0 4 0 0 4 0 0 89 1 1 10
0 0 0 13 14 13 0 1 0 0 0 1 0 0 2 0 1 1 2 4 1 0
0 13 33 3 0 0 1 1 5 0 1 8 5 0 4 0 4 0 2 8 0 0
0 2 1 4 0 6 6 3 7 1
3

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

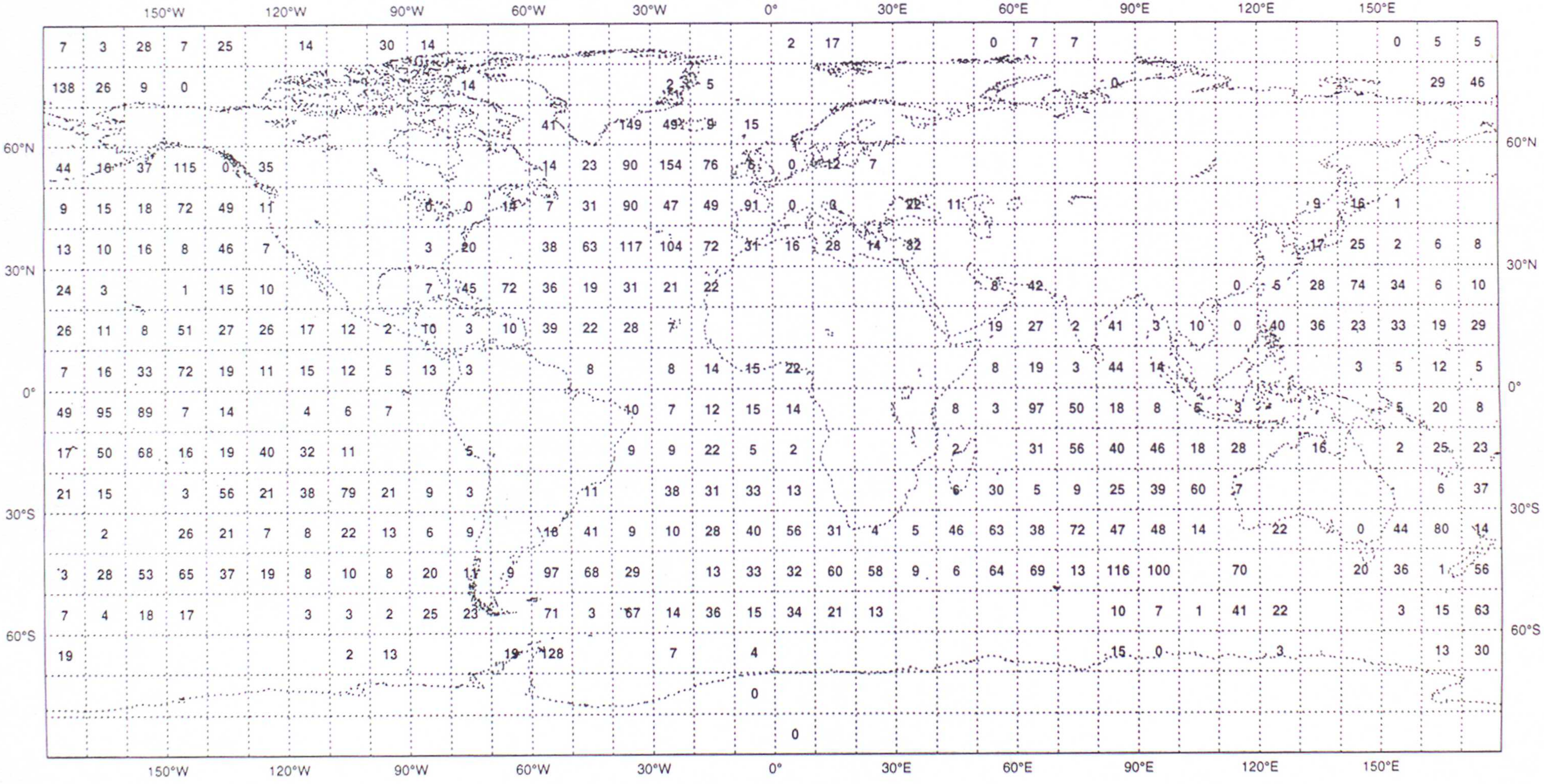
Monitoring procedures

Period		:One calendar month.	
Data monitored		:Reports from each unique identifier for drifting buoys.	
Standard of comparison		:Background field from UKMO global model.	
Position		:Average latitude and longitude for period.	
Observation times		: All hours	
Elements monitored		:Mean sea level pressure (hPa). :Wind speed ($m\ s^{-1}$). :Wind direction (degrees). :Sea surface temperature (degrees).	
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.	
	:PGE	:Percentage of observations with gross errors.	
	:%REJ	: Percentage of observations flagged excluding those with gross errors	
	:SD	:SD of difference of observations from background values excluding those with gross errors.	
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the wind observation is veered to the background.**	
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.	
GROSS ERROR LIMIT	:15 hPa	(pressure)	
	:25 $m\ s^{-1}$	(vector wind)	
	:10 degrees	(sea surface temperature)	
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.|bias|	≥ 4 hPa	(pressure),
		≥ 5 $m\ s^{-1}$	(wind speed),
		≥ 30 degrees	(direction).
		≥ 3 degrees	(sea surface temperature).
	2.SD	≥ 6 hPa	(pressure),
		≥ 80 degrees	(direction).
		≥ 5 degrees	(sea surface temperature).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
15921	-35.3	1.1	P	153	96	100	2.8	10.8	11.2
17519	-39.3	-11.5	P	73	10	100	2.2	10.0	10.2
23505	18.0	63.9	P	258	21	75	6.3	-1.0	6.4
61532	41.1	30.0	P	152	0	100	1.8	9.2	9.3
71541	-55.1	-13.1	P	26	100	100			
WIND SPEED									
52537	31.8	139.1	SPEED	197	0	100	2.8	-6.1	6.7
52648	24.7	136.3	SPEED	221	2	100	4.5	7.1	8.4
WIND DIRECTION									
41648	25.8	-70.9	DIRN.	280	1	0	22.1	55.9	60.1
46701	39.6	-166.1	DIRN.	152	1	0	16.2	-53.4	55.8
46779	58.6	-143.6	DIRN.	220	0	0	38.8	-31.8	50.2
52643	34.0	143.1	DIRN.	123	38	0	33.2	-66.2	74.1
SEA SURFACE TEMPERATURE									
15620	-0.8	0.9	SST	131	0	85	1.4	-3.4	3.7
17563	-30.0	-3.4	SST	569	46	88	3.4	6.6	7.5
21528	33.6	164.5	SST	202	100	100			
23906	-0.6	73.1	SST	48	100	100			
23968	3.2	96.2	SST	20	60	100	4.0	-6.3	7.5
32526	8.5	-86.8	SST	182	100	100			
33502	-28.0	-14.1	SST	92	0	100	0.7	5.2	5.2
46972	18.4	-144.0	SST	184	0	100	0.2	4.1	4.1
51767	1.7	-150.9	SST	164	0	95	2.2	-4.2	4.7
52536	13.4	144.8	SST	342	3	100	3.6	-3.2	4.8
55905	-54.1	-79.5	SST	391	0	100	0.3	3.1	3.1
56532	-55.6	84.6	SST	21	0	67	2.2	4.3	4.8
61532	41.1	30.0	SST	152	1	100	2.7	-5.4	6.0
61676	30.4	-89.6	SST	42	55	74	4.7	-0.5	4.7

Figure 2. DRIFTER mean daily count. FEBRUARY 2003
All hours
Global average number of observations in 24 hours = 8691



7	3	28	7	25		14		30	14									2	17				0	7	7								0	5	5
138	26	9	0							14					2	5										0								29	46
												41		149	49	9	15																		
44	16	37	115	0	35							14	23	90	154	76	8	0	12	7															
9	15	18	72	49	11				0	0	14	7	31	90	47	49	91	0	0		22	11									9	16	1		
13	10	16	8	46	7				3	20		38	63	117	104	72	31	16	28	14	32										17	25	2	6	8
24	3		1	15	10				7	45	72	36	19	31	21	22							8	42					0	5	28	74	34	6	10
26	11	8	51	27	26	17	12	2	10	3	10	39	22	28	7								19	27	2	41	3	10	0	40	36	23	33	19	29
7	16	33	72	19	11	15	12	5	13	3			8		8	14	15	22					8	19	3	44	14					3	5	12	5
49	95	89	7	14		4	6	7						10	7	12	15	14				8	3	97	50	18	8	6	3				5	20	8
17	50	68	16	19	40	32	11			5				9	9	22	5	2				2		31	56	40	46	18	28		16		2	25	23
21	15		3	56	21	38	79	21	9	3			11		38	31	33	13				6	30	5	9	25	39	60	7					6	37
	2		26	21	7	8	22	13	6	9		18	41	9	10	28	40	56	31	4	5	46	63	38	72	47	48	14		22		0	44	80	14
3	28	53	65	37	19	8	10	8	20	11	9	97	68	29		13	33	32	60	58	9	6	64	69	13	116	100		70			20	36	1	56
7	4	18	17			3	3	2	25	23		71	3	67	14	36	15	34	21	13						10	7	1	41	22			3	15	63
19							2	13			19	128			7		4									15	0			3				13	30
																	0																		
																		0																	

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.|bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60728	36.4N	10.7E	1	MS	55	0	0	0	0.8	-8.8	8.8
62271	24.2N	23.3E	417	M	35	0	0	0	0.7	4.0	4.1
62790	12.1N	24.9E	674	M	40	0	0	5	1.8	4.6	4.9
63801	4.9S	29.6E	882	S8	86	0	0	0	1.2	7.2	7.3
64756	13.9N	20.8E	545	M	48	14	29	8	0.9	0.2	0.9
65355	9.8N	1.1E	342	MS	98	0	0	0	1.2	-12.1	12.2
67223	13.1S	39.0E	534	S8	58	7	12	60	2.3	12.6	12.8
67229	14.7S	34.3E	1270	S8	47	46	98	70	0.0	0.7	0.7
68014	19.6S	18.1E	1411	S8	61	0	0	0	0.6	-4.1	4.1
68030	18.5S	25.6E	1071	8	61	1	2	7	2.5	4.9	5.5
68312	26.5S	18.1E	1067	S8	60	0	0	0	0.7	7.1	7.1
68338	26.9S	24.6E	1234	S8	40	31	78	0	0.4	0.6	0.7
68396	26.5S	31.3E	641	S8	49	0	0	4	1.7	4.6	4.9
68575	30.0S	30.0E	1175	S8	93	93	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
21432	76.0N	137.9E	8	M	31	0	0	35	1.6	-5.3	5.5
24671	63.9N	135.9E	402	MS	104	2	2	0	3.7	6.9	7.8
24688	63.3N	143.2E	741	MS	107	25	23	0	4.7	5.4	7.2
30554	54.5N	113.6E	995	MS	107	0	0	0	4.3	7.1	8.3
30967	49.9N	115.8E	623	MS	47	1	2	0	2.0	-7.1	7.4
35358	49.6N	63.5E	123	MS	94	0	0	0	2.4	-5.7	6.2
36020	52.5N	80.2E	59	MS	54	5	9	0	6.5	-6.5	9.2
36096	51.7N	94.5E	628	M	103	0	0	0	3.9	6.3	7.4
36982	41.9N	78.2E	3635	S7	104	1	1	3	1.8	6.0	6.3
40700	39.6N	47.9E	45	MS	71	2	3	0	1.2	-6.3	6.4
40713	37.4N	46.3E	1475	MS	71	14	20	0	0.8	13.2	13.2
40741	36.5N	61.2E	235	MS	70	0	0	0	1.2	-4.9	5.0
40757	35.6N	53.4E	1171	MS	69	0	0	1	1.8	4.8	5.1
40780	33.6N	46.4E	1362	MS	60	0	0	2	0.9	5.0	5.1
41254	23.1N	57.6E	1755	S8	66	66	100	0			
41396	16.0N	48.9E	700	MS	55	0	0	0	0.9	6.8	6.9
43415	8.8N	80.5E	98	S	57	57	100	0			
44212	50.0N	92.1E	940	MS	106	0	0	46	2.7	4.7	5.4
44265	46.1N	91.5E	1186	MS	104	3	3	2	2.0	4.9	5.3
44277	46.4N	96.3E	2182	MS	106	0	0	13	1.4	-4.1	4.3
44304	47.3N	110.6E	1035	MS	107	0	0	1	1.2	-5.5	5.6
48925	20.7N	102.0E	550	S	30	0	0	0	1.3	-11.0	11.1
48935	19.5N	103.1E	1050	8	46	24	52	28	3.3	-5.1	6.1
48938	19.2N	101.7E	326	M	31	17	55	55	7.8	5.6	9.6
50727	47.2N	120.0E	1028	MS	107	0	0	57	0.9	4.3	4.4
51288	45.4N	90.5E	1651	S	107	0	0	0	1.1	-4.9	5.0
51334	44.6N	82.9E	321	M	105	0	0	0	2.5	4.7	5.3
51379	44.0N	89.6E	794	M	105	0	0	0	2.2	6.0	6.4
51495	43.2N	91.7E	874	M	104	0	0	0	2.0	8.6	8.8
52866	36.6N	101.8E	2262	S	107	0	0	0	1.3	-4.2	4.4
53083	44.6N	114.2E	1183	M	106	1	1	0	2.6	7.4	7.8
53352	41.7N	110.4E	1377	M	106	0	0	0	3.1	5.8	6.6
53480	41.0N	113.1E	1416	M	105	0	0	0	2.6	4.9	5.5
54115	43.6N	118.1E	800	M	106	0	0	2	1.8	4.2	4.6
54386	41.4N	128.2E	1018	M	106	0	0	0	2.7	4.4	5.2
56193	32.4N	104.5E	877	M	107	0	0	5	2.9	4.5	5.4
56287	30.0N	103.0E	629	M	107	0	0	6	1.8	4.3	4.7
56385	29.5N	103.3E	3049	S	107	0	0	4	2.1	-5.0	5.4
56462	29.0N	101.5E	2994	S	107	0	0	0	1.3	8.9	9.0
56768	25.0N	101.5E	1773	S	107	0	0	68	0.9	-4.2	4.3
57816	26.6N	106.7E	1074	MS	107	96	90	0	0.2	-14.7	14.7

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	122	MS	42	1	2	2	1.1	-8.5	8.6
82181	2.0S	54.1W	146	MS	72	0	0	0	1.0	5.4	5.5
82704	7.6S	72.7W	170	MS	76	1	1	0	1.0	-4.5	4.6
83235	12.4S	46.4W	604	MS	76	0	0	0	0.7	7.0	7.0
83332	14.1S	46.4W	826	MS	81	48	59	0	0.5	14.4	14.4
83470	17.9S	50.9W	727	MS	81	0	0	0	0.7	-4.9	4.9
83531	18.6S	46.5W	940	MS	81	0	0	0	0.5	-6.2	6.2
83836	25.5S	50.6W	837	MS	81	0	0	0	0.7	-5.1	5.1
84455	6.5S	76.4W	281	MS	65	0	0	0	1.2	6.6	6.7
84472	7.1S	78.5W	2620	S	37	0	0	0	0.7	-5.6	5.6
84686	13.6S	72.0W	3248	S	84	0	0	0	0.6	-4.6	4.6
84688	13.7S	73.4W	3444	S	35	0	0	0	0.4	-12.0	12.0
84720	14.9S	75.0W	567	MS	36	1	3	0	0.6	4.6	4.6
84782	18.1S	70.3W	468	MS	69	0	0	0	1.1	6.7	6.8
85141	14.5S	67.6W	204	MS	52	0	0	2	1.6	5.9	6.1
85264	18.5S	64.1W	1998	S	52	52	100	0			
85312	19.8S	63.9W	992	S	44	2	5	5	1.1	-11.6	11.7
85432	22.5S	68.9W	2320	S8	74	0	0	1	1.1	5.5	5.6

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71021	61.3N	124.5W	283	MS	106	0	0	0	1.2	4.7	4.9
71048	61.6N	125.8W	610	S	82	0	0	6	1.7	8.5	8.7
71049	66.0N	91.8W	150	MS	107	97	91	0	0.8	13.9	13.9
71176	60.0N	64.2W	551	MS	83	0	0	5	1.5	-4.2	4.5
71177	57.1N	61.5W	834	MS	105	0	0	2	1.8	-4.9	5.2
71179	54.7N	58.4W	683	MS	83	0	0	13	2.6	-4.4	5.1
71181	47.1N	55.3W	29	MS	106	1	1	3	2.2	-6.0	6.4
71475	49.3N	124.8W	2	MS	107	0	0	0	0.9	-8.1	8.1
71506	67.0N	136.2W	720	MS	107	0	0	8	2.1	-6.1	6.5
71599	44.4N	65.2W	127	MS	106	0	0	0	1.2	-4.6	4.8
71747	48.8N	91.6W	424	MS	107	0	0	0	0.8	4.1	4.2
72327	36.1N	86.7W	182	MS	106	0	0	0	0.7	4.2	4.3
76055	31.0N	114.9W	440	MS	39	39	100	0			
76243	28.7N	100.5W	250	MS	40	0	0	5	2.1	5.4	5.8
76543	22.0N	98.8W	104	MS	25	0	0	4	1.3	6.9	7.0
76743	18.0N	92.9W	16	MS	46	0	0	0	1.0	5.7	5.8
76762	17.5N	99.5W	1265	MS	52	0	0	4	1.7	4.9	5.2
76845	16.7N	92.6W	2116	MS	28	0	0	0	1.6	4.0	4.3

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
92010	6.1S	145.4E	1587	M	23	0	0	0	0.6	9.4	9.4
94130	14.8S	131.9E	120	MS	106	0	0	0	1.1	5.3	5.4
94541	29.8S	151.1E	584	MS	103	0	0	0	0.9	-8.5	8.5
96505	3.7N	115.7E	900	S8	33	33	100	0			
98222	17.6N	120.4E	31	M	99	0	0	29	4.0	-4.1	5.7
98553	11.6N	125.4E	6	M	98	0	0	1	1.1	-5.5	5.6

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	711	MS	107	0	0	0	1.1	7.3	7.4
06605	47.1N	7.1E	1599	S8	104	0	0	0	1.2	-5.0	5.1
06685	47.0N	9.1E	515	MS	104	0	0	7	1.4	7.4	7.5
08912	42.9N	0.8W	1434	MS	317	317	100	0			
08922	42.8N	0.2W	1660	MS	134	134	100	0			

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
10850	48.8N	10.7E	457	MS	312	0	0	0	0.5	-5.8	5.8
11116	47.5N	10.8E	870	MS	51	0	0	0	0.7	4.1	4.2
13269	44.3N	19.9E	176	MS	106	0	0	0	0.8	8.3	8.3
14554	44.9N	18.4E	136	S	51	5	10	4	0.6	-13.7	13.7
16344	39.3N	16.4E	1710	S8	64	0	0	0	1.2	4.7	4.9
16538	40.1N	9.3E	1022	S	33	0	0	6	2.7	8.7	9.1
17203	38.9N	40.5E	1177	S8	107	0	0	3	1.3	4.5	4.7

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	68	0	0	0	1.2	-5.8	5.9
89253	63.2S	55.4W	75	M	208	0	0	0	1.3	4.9	5.1
89263	66.0S	66.1W	20	M	206	102	50	0	11.5	-4.9	12.5
89264	71.4S	68.9W	780	S	108	1	1	0	1.2	7.6	7.7
89272	75.0S	70.8W	1395	S	220	220	100	0			
89572	68.9S	78.0E	363	S	126	126	100	20			
89610	65.9S	113.1E	90	S	121	0	0	40	1.4	-7.9	8.0
89614	66.6S	111.2E	500	S	121	116	96	11	0.3	-13.3	13.3
89637	69.5S	130.0E	2560	S	251	69	27	0	2.7	12.2	12.5
89666	76.7S	163.0E	200	S	23	23	100	0			
89744	74.0S	43.1E	3353	S	237	0	0	0	0.6	7.0	7.0
89811	66.7S	112.8E	1366	M	216	0	0	3	1.3	-4.4	4.6

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	2539	0	37	2.0	0.2	2518	0	36	0	8.0	0.7
AAL	4479	0	33	1.7	0.0	4338	0	34	0	7.8	0.6
AAR	1321	1	7	1.9	-0.6	1298	0	7	0	7.4	0.2
ABD	21	0	5	1.2	0.1	20	0	5	0	6.4	1.7
ACA	2873	1	15	1.7	-0.4	2648	0	15	0	7.0	0.1
ACI	39	0	36	1.5	0.1	39	0	33	0	4.7	-0.6
AEA	589	0	2	1.5	0.5	319	0	2	0	6.7	0.2
AEL	807	1	10	1.8	-0.1	618	0	10	0	8.6	0.2
AFL	352	0	4	1.8	0.3	287	1	4	0	7.8	0.3
AFR	1913	1	7	1.5	0.2	1418	1	10	0	7.8	0.2
AIS	408	0	6	1.6	-0.3	346	0	9	0	9.1	0.7
AJM	347	1	3	1.6	-0.2	291	0	4	0	8.3	0.7
AJX	245	0	8	1.6	0.1	248	2	10	0	7.1	0.0
AMM	130	0	8	1.5	0.3	91	0	9	0	8.5	0.5
AMT	995	1	38	1.7	0.2	990	1	39	0	7.8	0.5
AMX	252	2	6	1.7	0.1	169	0	6	0	9.2	-0.1
ANA	343	0	7	1.5	0.4	340	1	9	0	8.1	-0.2
ANZ	4451	0	29	1.2	0.2	4416	0	29	0	6.1	0.5
ATN	75	0	100	4.5	-1.8	75	1	37	0	14.3	3.1
AUA	23	0	4	1.2	-0.1	24	0	8	0	5.9	1.5
AVA	250	0	2	1.9	0.7	149	1	5	0	8.1	0.5
AVN	129	2	50	1.6	0.2	127	0	49	0	6.3	0.0
AZA	465	1	11	2.4	0.2	389	1	6	0	9.0	0.1
BAL	175	1	9	1.8	-0.2	144	1	9	0	7.8	1.0
BAW	788	1	5	1.8	-0.2	709	0	4	0	7.1	0.5
BBR	171	1	5	1.8	0.6	100	0	10	0	12.5	0.7
BHP	30	0	0	1.6	-0.5	27	0	0	0	6.3	-0.3
BPA	148	9	30	4.0	1.5	123	2	10	0	8.1	0.3
BSK	27	4	11	1.1	-0.1	25	0	8	0	6.1	1.3
BWA	301	1	5	1.9	0.1	209	0	4	0	8.5	-0.4
CAL	35	0	3	1.9	0.2	37	3	8	0	7.2	0.3
CCA	232	1	14	2.8	0.3	233	1	100	0	9.8	-0.2
CES	314	1	5	1.8	0.0	318	2	7	0	7.8	0.3
CFG	1077	1	4	1.6	-0.6	892	0	5	0	6.5	0.2
CGA	110	0	1	1.2	0.0	110	0	1	0	4.9	0.0
CGF	65	0	2	1.5	-0.7	65	0	2	0	4.9	0.9
CGH	113	0	1	1.1	-0.1	113	0	1	0	4.9	0.7
CKS	234	2	41	1.5	0.3	236	0	39	0	6.9	0.0
CLX	354	0	4	1.7	-0.5	288	0	5	0	7.2	-0.1
CMI	28	0	29	1.7	-0.3	28	0	25	0	4.5	-0.5
COA	585	1	39	1.6	-0.1	534	0	40	0	8.0	1.2
CRL	806	1	5	1.8	0.7	546	0	5	0	8.8	0.5
CSN	103	2	14	1.7	0.1	102	1	16	0	10.8	0.6
CUB	224	0	40	1.6	0.9	166	1	8	0	12.1	-1.5
DAB	190	0	7	1.5	-0.2	187	0	7	0	5.5	-0.1
DAI	247	0	5	1.4	0.5	247	0	5	0	5.0	0.4
DAL	2208	0	37	1.6	-0.1	2160	0	38	0	7.2	0.5
DBR	42	0	5	1.6	0.0	42	2	5	0	6.7	-0.2
DCE	145	1	6	1.1	0.0	122	0	7	0	7.3	-0.1
DCS	22	0	14	2.6	-1.0	22	0	14	0	11.7	1.2
DHL	59	0	100	6.4	-6.0	57	0	93	0	13.4	3.1
DLH	1264	1	13	1.6	0.0	1179	1	14	0	6.6	0.8
ECI	26	0	12	1.5	-0.5	22	0	14	0	5.1	0.9
EDW	83	1	5	1.6	-0.3	75	0	7	0	6.9	1.0
EEZ	30	10	17	1.6	-0.1	30	0	17	0	9.2	-0.7
EIA	253	4	100	3.1	1.8	244	0	100	0	17.7	3.9
ELY	99	1	4	2.0	-0.1	93	1	3	0	6.0	0.9
ETH	24	0	8	1.1	0.7	20	0	10	0	5.1	-0.1
EVA	237	0	4	1.9	-0.8	242	0	6	0	8.0	-0.7

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FDX	1753	1	36	1.5	0.2	1739	0	37	0	7.9	0.5
FGS	145	0	1	1.5	0.3	144	0	1	0	4.6	0.6
FGZ	71	0	0	1.3	-0.2	70	0	0	0	4.9	0.5
FIN	157	1	6	1.6	0.1	152	1	5	0	7.3	-0.1
FJI	851	2	48	1.4	0.5	830	0	47	0	6.3	0.3
FOM	564	0	29	1.2	0.0	559	0	30	0	6.1	1.0
FWQ	39	5	54	2.4	-0.6	39	5	51	0	4.7	1.7
GCO	445	1	12	1.7	0.0	447	0	15	0	10.3	1.7
GHA	70	1	6	1.4	-0.3	57	0	11	0	13.2	-1.3
GRL	69	0	3	1.8	-0.3	66	0	3	0	5.4	0.1
GTI	354	1	16	1.9	0.1	345	0	17	0	10.4	0.5
GVA	35	0	0	1.2	0.2	35	0	0	0	5.9	0.4
GVF	32	0	0	1.4	-0.4	32	0	0	0	5.2	-0.6
GVG	45	0	0	1.3	-0.1	45	0	0	0	5.7	-0.4
GVH	29	0	3	1.5	-0.1	29	0	3	0	4.1	0.4
GVL	36	0	0	1.2	-0.2	36	0	0	0	5.5	-0.3
GVR	101	0	1	1.2	0.0	101	0	2	0	6.0	0.4
GVT	25	0	4	1.8	-0.5	25	0	0	0	5.9	0.6
GVW	28	0	4	1.3	-0.8	28	0	4	0	4.4	-0.4
GVX	30	0	0	1.2	0.0	29	0	0	0	3.8	0.4
GWW	54	0	2	1.5	-0.5	54	0	2	0	5.8	2.0
HAL	3849	0	34	1.6	-0.3	3819	0	34	0	8.0	0.8
HMY	26	0	0	1.6	-0.9	20	0	0	0	6.5	1.5
HRH	121	2	72	2.3	2.0	121	0	71	0	4.9	0.3
IBE	2684	0	5	1.6	0.4	1580	0	7	0	8.9	0.4
ICE	623	0	3	1.7	-0.1	669	1	8	0	10.3	0.6
IWD	154	1	4	1.5	-0.2	103	0	5	0	7.3	1.6
JAA	138	1	4	1.9	1.4	138	0	3	0	9.0	3.5
JAL	2350	0	5	1.7	0.2	2341	0	6	0	7.6	0.2
JAZ	1000	0	5	1.5	0.5	1002	0	6	0	7.6	0.1
JBU	31	6	6	1.1	-0.4	34	0	0	0	4.7	-0.5
KAL	2744	1	10	1.9	-0.3	2708	0	10	0	7.9	0.1
KLM	1741	0	2	1.6	0.2	1427	0	5	0	7.9	0.3
LAN	548	0	8	1.5	0.1	544	0	8	0	7.2	0.7
LAP	73	1	40	2.3	1.4	71	1	39	0	8.9	-0.2
LDA	26	0	12	1.8	-0.3	25	0	8	0	7.4	-0.1
LDI	548	0	3	1.5	-0.4	365	1	4	0	8.0	-0.1
LIB	116	0	2	1.7	1.1	80	0	9	0	9.9	1.1
LOT	59	2	7	1.9	-1.2	54	0	7	0	7.7	0.6
LTU	725	0	5	1.8	-0.1	606	0	5	0	7.6	0.8
LXR	61	8	20	1.8	0.6	43	0	19	0	11.3	-0.6
MAS	260	0	8	1.9	-0.6	255	0	8	0	8.7	-0.9
MON	80	0	1	1.6	0.1	65	0	2	0	9.0	1.2
MPD	211	2	3	1.6	0.1	144	0	3	0	6.6	0.5
MPH	464	0	2	1.6	-0.7	433	0	2	0	7.2	-0.1
MYT	270	1	5	1.9	0.3	233	1	4	0	7.7	0.1
NAO	201	0	36	1.6	-0.6	198	0	37	0	6.8	-0.1
NCA	1057	0	3	1.6	0.2	768	0	4	0	7.8	0.4
NWA	8087	1	11	1.7	0.0	8061	0	10	0	7.4	0.3
NZL	3289	0	12	1.3	0.2	3289	0	12	0	4.9	0.2
OAE	464	0	36	1.5	-0.3	460	0	61	0	10.4	1.7
PAC	556	1	19	1.9	0.0	557	1	18	0	7.3	0.9
PAL	1065	0	11	1.9	-0.4	1007	0	12	0	8.4	0.4
PAO	308	0	61	1.9	1.4	307	0	60	0	5.5	1.0
PUA	20	5	25	2.6	1.3	20	0	30	0	20.0	0.6
QFA	2583	0	44	1.2	0.4	2577	0	44	0	6.1	0.5
RAF	22	0	0	1.5	1.0	22	0	0	0	6.1	0.3
RAM	259	2	7	1.9	0.1	149	1	66	0	10.7	0.1
RCH	476	1	80	2.1	0.1	432	1	100	0	11.9	0.9

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
RJA	34	6	18	1.6	-0.1	34	0	12	0	6.6	1.6
RZO	278	1	5	1.7	-0.3	124	0	7	0	7.9	1.0
SAA	310	0	4	2.0	-1.2	257	0	5	0	8.7	0.0
SEU	130	1	5	1.9	0.0	115	1	5	0	8.0	0.7
SIA	283	0	1	1.1	0.1	285	0	1	0	5.1	0.0
SLR	252	0	6	1.4	-0.2	229	0	7	0	7.5	0.0
SQC	46	0	11	0.9	0.2	46	0	11	0	4.8	-0.8
SSV	31	0	23	2.1	-0.2	31	0	26	0	16.0	0.8
SVA	23	0	0	1.4	0.1	28	0	4	0	4.9	0.5
TAG	24	0	17	1.8	-0.4	23	0	17	0	6.4	-0.2
TAP	474	1	4	1.8	-0.3	181	0	6	0	7.7	0.3
THA	85	0	5	2.2	0.2	85	0	6	0	9.1	-0.7
THT	71	1	34	2.2	0.2	69	0	32	0	8.0	1.6
TPA	35	0	6	0.8	0.2	32	0	6	0	6.1	0.3
TSC	47	0	9	2.0	-0.3	43	0	7	0	6.7	1.3
UAL	107859	0	74	1.4	-0.3	108156	0	74	0	5.5	0.7
UPS	1679	0	47	2.0	0.4	1662	0	46	0	8.2	0.1
USA	140	1	4	1.7	-0.2	117	0	7	0	9.0	0.4
VIR	253	1	5	2.0	-0.3	239	0	5	0	7.5	0.5
VPB	33	0	15	2.0	0.1	33	0	15	0	6.2	-0.2
VRG	151	1	13	2.0	1.0	147	0	13	0	12.4	-0.9
VVJ	35	0	9	1.6	-0.6	40	0	10	0	8.3	1.0
VVR	87	0	30	2.6	1.6	87	0	28	0	6.8	0.4
WOA	478	1	11	1.8	0.1	461	0	11	0	9.6	0.8
YSS	42	0	0	1.5	0.4	28	0	0	0	6.5	1.6
9VS	145	0	3	1.3	-0.1	145	0	3	0	5.8	0.5
AR	436	0	100	2.8	2.4	432	0	6	0	5.1	1.3
AU	34823	0	10	1.2	0.5	34863	0	10	0	5.3	0.4
EU	127813	0	26	1.2	0.1	127812	0	27	0	4.6	0.5
KL	3303	0	5	1.4	0.5	3286	0	5	0	6.2	0.6
LH	1656	0	10	1.7	1.1	1641	0	10	0	5.1	0.5
MK	3322	0	95	1.9	1.4	3312	0	7	0	7.3	1.0
SA	1527	0	4	2.0	1.7	1528	0	4	0	6.3	0.2
SV	189	0	5	2.3	2.2	188	0	4	0	5.7	0.3
N	2287	0	17	1.7	0.2	2299	0	17	0	6.8	0.8
US ACARS	602847	0	60	1.5	0.3	602842	0	59	0	5.7	0.7

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:1000.0 – 300.1 hPa
Elements monitored		:TEMP in °C ; WIND in $m\ s^{-1}$
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS		:10.0 °C ; 60 $m\ s^{-1}$ Vector Wind
SELECTION CRITERIA		:N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	28	0	43	3.1	-0.5	28	0	39	0	14.3	-3.5
AAL	521	1	30	1.2	0.0	498	0	30	0	6.7	0.2
ACA	31	6	39	2.3	-0.3	30	0	40	0	16.8	0.0
AFL	30	0	0	2.3	0.7	28	0	4	0	7.9	-0.6
AFR	169	1	6	1.5	-0.2	135	1	9	0	8.3	0.8
AMT	39	0	33	1.1	0.0	39	0	36	0	7.1	1.1
ANZ	123	2	21	1.0	0.1	123	0	22	0	6.7	0.8
APW	23	0	9	2.7	-1.8	23	0	13	0	13.2	1.2
ATN	85	2	100	3.8	-2.2	84	4	24	0	10.8	1.0
AZA	24	0	8	1.2	-0.1	24	0	8	0	6.4	-0.6
CFC	64	0	5	1.5	0.1	55	0	5	0	6.9	0.8
CFG	32	0	0	1.7	-0.5	25	0	8	0	10.4	-0.2
CIU	31	3	10	1.6	0.9	22	0	14	0	8.9	1.6
CLX	29	0	10	1.9	-0.5	30	0	7	0	5.4	0.6
COA	53	0	49	1.4	-0.3	53	0	51	0	5.3	1.3
CUB	31	10	65	4.0	2.6	21	0	14	0	11.3	-0.1
DAL	273	0	48	1.9	-0.2	271	1	48	0	9.0	-0.4
DLH	257	0	13	1.5	-0.3	248	0	13	0	6.5	0.4
EIA	37	0	100	2.7	1.3	37	0	100	0	19.6	3.6
EVA	26	0	15	1.5	-1.1	26	0	15	0	5.6	0.4
FDX	481	0	31	1.5	0.1	473	0	30	0	8.0	0.7
FIN	33	0	3	2.2	-0.5	34	0	3	0	6.4	0.8
GAF	42	0	0	1.0	0.1	34	0	3	0	6.7	1.6
GCO	99	4	16	2.1	-0.4	99	0	23	0	13.5	-0.2
GTI	39	0	0	1.6	-0.9	41	0	0	0	5.9	-0.3
HAL	415	0	34	1.8	-0.1	408	0	35	0	7.9	1.2
IBE	58	2	7	1.4	0.2	43	0	12	0	8.9	1.9
ICE	20	0	0	2.2	-0.9	21	0	0	0	5.1	0.8
JAA	58	2	3	2.1	0.2	58	0	5	0	10.1	2.1
JAL	97	3	11	1.7	0.3	93	0	10	0	7.7	-0.4
JAZ	126	1	5	1.3	0.6	126	0	5	0	7.3	0.2
KAL	48	0	17	1.2	-0.4	48	0	19	0	6.3	0.4
KIW	33	6	45	2.4	0.4	33	0	39	0	5.0	1.1
KLM	59	0	0	1.4	0.5	38	0	0	0	6.3	0.2
LAN	23	0	0	1.1	0.5	24	0	4	0	7.6	1.8
MPH	124	1	2	1.3	-0.1	112	0	3	0	6.5	-0.3
NCA	43	0	0	1.4	0.1	32	0	0	0	4.0	-0.4
NWA	345	2	18	1.8	0.3	341	0	16	0	6.9	0.3
NZL	15660	0	55	1.6	0.7	15660	0	55	0	4.9	0.3
OAE	30	7	47	2.8	0.9	31	0	65	0	9.9	-0.6
PAC	42	0	10	1.8	0.4	43	0	16	0	13.3	1.0
PAL	86	0	24	1.8	-0.6	83	0	25	0	8.7	0.3
QFA	115	1	48	1.1	-0.2	114	0	45	0	4.8	-0.1
RCH	75	1	73	3.9	-1.8	59	3	100	0	12.6	1.1
RRR	33	0	12	3.2	2.5	29	0	14	0	12.5	1.4
SAA	34	0	3	1.6	-1.0	34	0	6	0	5.8	-1.8
SIA	24	0	0	1.0	0.1	24	0	0	0	5.6	-0.6
SKI	30	17	43	3.8	-2.1	67	0	24	0	11.5	2.2
UAL	251060	0	79	1.1	-0.1	250807	0	79	0	4.6	0.4
UPS	158	0	42	1.3	-0.1	156	0	42	0	8.6	0.1
VVP	34	6	35	4.0	-2.0	34	0	29	0	10.9	1.2
WOA	102	1	8	1.8	0.1	106	0	7	0	8.0	1.3
AR	260	0	100	1.8	1.4	257	0	44	0	5.3	0.5
AU	27216	0	53	1.2	0.3	27275	0	53	0	4.1	0.0
EU	470187	0	67	1.1	0.2	467944	0	66	0	3.8	0.1

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
KL	1911	0	55	1.7	0.0	1907	0	54	0	4.5	0.6
LH	711	0	65	1.2	0.8	711	0	65	0	3.7	0.4
MK	2103	0	95	1.4	0.9	2076	0	54	0	4.4	0.5
SA	721	1	48	1.9	1.4	720	0	49	0	6.2	1.0
SV	91	0	47	2.4	1.7	90	0	47	0	5.8	2.9
N	49	0	24	2.2	0.0	50	0	22	0	7.5	1.8
US ACARS	1231186	0	77	1.3	0.4	1227576	0	77	0	4.7	0.3

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 34363

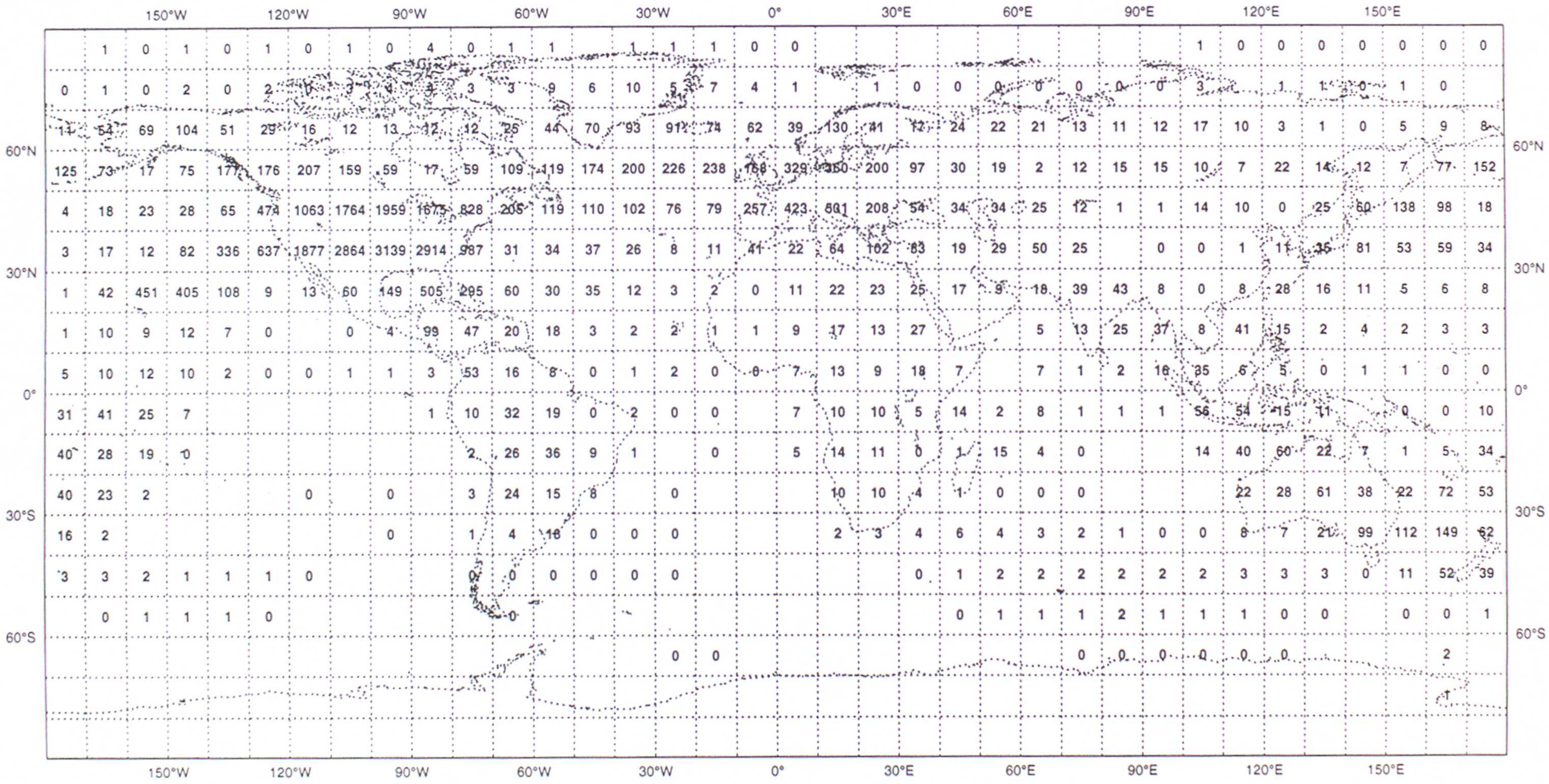

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
1 0 1 0 1 0 1 0 4 0 1 1 1 1 1 0 0 1 0 0 0 0 0 0 0 0
0 1 0 2 0 2 3 3 4 3 3 3 9 6 10 5 7 4 1 1 0 0 0 0 0 0 0 3 1 1 0 1 0
14 54 69 104 51 29 16 12 13 12 12 25 44 70 93 91 74 62 39 130 41 12 24 22 21 13 11 12 17 10 3 1 0 5 9 8
125 73 17 75 177 176 207 159 59 17 59 109 119 174 200 226 238 168 329 350 200 97 30 19 2 12 15 15 10 7 22 14 12 7 77 152
4 18 23 28 65 474 1063 1764 1959 1675 828 205 119 110 102 76 79 257 423 801 208 54 34 34 25 12 1 1 14 10 0 25 60 138 98 18
3 17 12 82 336 637 1877 2864 3139 2914 987 31 34 37 26 8 11 41 22 64 102 83 19 29 50 25 0 0 1 11 35 81 53 59 34
1 42 451 405 108 9 13 60 149 505 295 60 30 35 12 3 2 0 11 22 23 25 17 9 18 39 43 8 0 8 28 16 11 5 6 8
1 10 9 12 7 0 0 4 99 47 20 18 3 2 2 1 1 9 17 13 27 5 13 25 37 8 41 15 2 4 2 3 3
5 10 12 10 2 0 0 1 1 3 53 16 8 0 1 2 0 0 7 13 9 18 7 7 1 2 16 35 6 5 0 1 1 0 0
31 41 25 7 1 10 32 19 0 2 0 0 7 10 10 5 14 2 8 1 1 1 56 54 15 11 0 0 10
40 28 19 0 2 26 36 9 1 0 5 14 11 0 1 15 4 0 14 40 60 22 7 1 5 34
40 23 2 0 0 3 24 15 8 0 10 10 4 1 0 0 0 22 28 61 38 22 72 53
16 2 0 1 4 16 0 0 0 2 3 4 6 4 3 2 1 0 0 8 7 21 99 112 149 62
3 3 2 1 1 1 0 0 0 0 0 0 0 1 2 2 2 2 2 2 3 3 3 0 11 52 39
0 1 1 1 0 0 1 1 1 2 1 1 1 0 0 0 0 1
0 0 0 0 0 0 0 0 2

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 71426

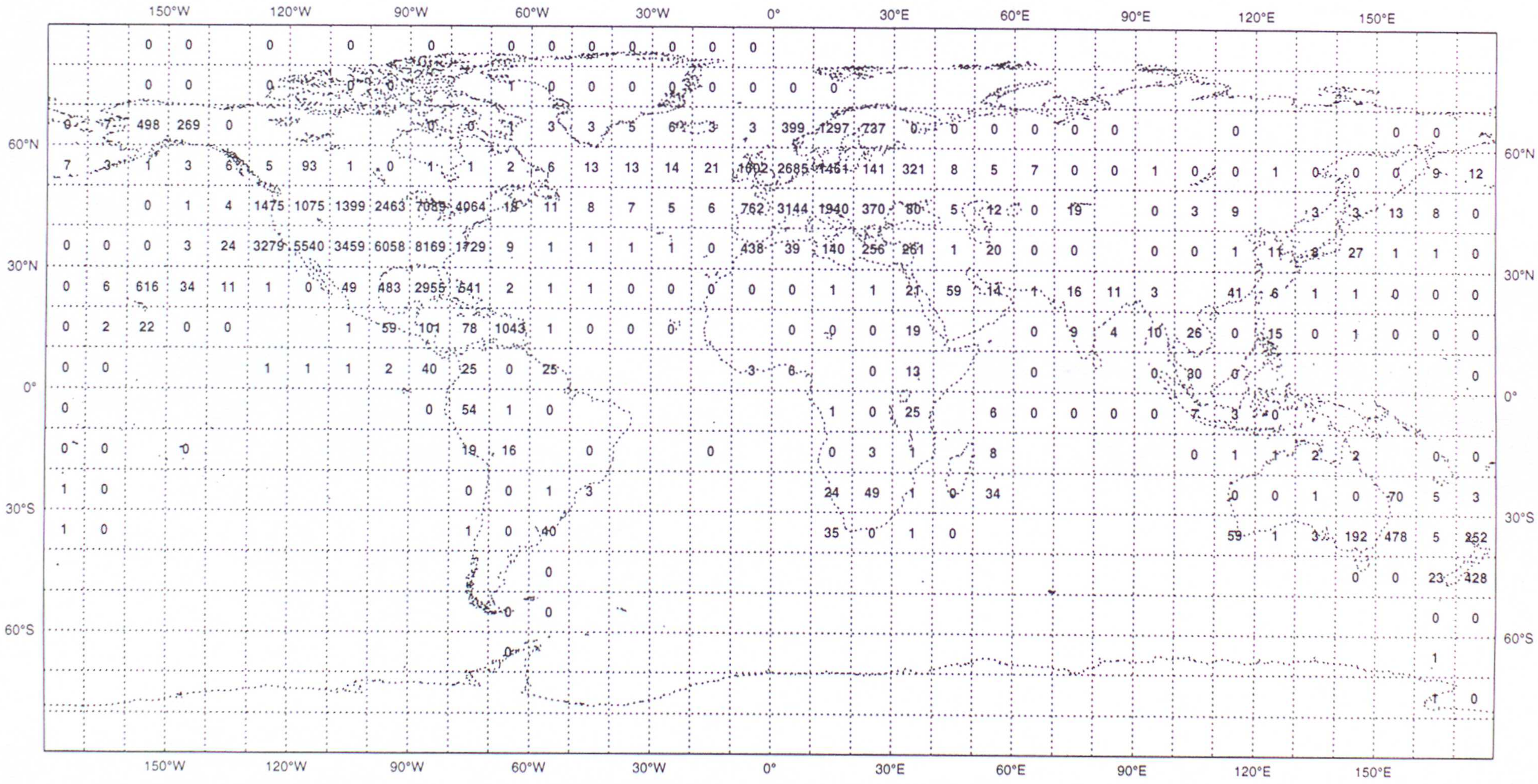

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 1 0 0 0 0 0 0 0 0
0 7 498 269 0 0 0 1 3 3 5 6 3 3 399 1297 737 0 0 0 0 0 0 0 0 0 0
7 3 1 3 6 5 93 1 0 1 1 2 6 13 13 14 21 1602 2685 1451 141 321 8 5 7 0 0 1 0 0 1 0 0 0 9 12
0 1 4 1475 1075 1399 2463 7089 4064 18 11 8 7 5 6 762 3144 1940 370 80 5 12 0 19 0 3 9 3 3 13 8 0
0 0 0 3 24 3279 5540 3459 6058 8169 1729 9 1 1 1 1 0 438 39 140 256 261 1 20 0 0 0 0 1 11 8 27 1 1 0
0 6 616 34 11 1 0 49 483 2955 541 2 1 1 0 0 0 0 0 1 1 21 59 14 1 16 11 3 41 6 1 1 0 0 0
0 2 22 0 0 1 59 101 78 1043 1 0 0 0 0 0 0 19 0 9 4 10 26 0 15 0 1 0 0 0
0 0 1 1 1 2 40 25 0 25 3 6 0 13 0 0 30 0 0
0 0 54 1 0 1 0 25 6 0 0 0 0 7 3 0
0 0 0 19 16 0 0 0 3 1 8 0 1 1 2 2 0 0
1 0 0 0 1 3 24 49 1 0 34 0 0 1 0 70 5 3
1 0 1 0 40 35 0 1 0 59 1 3 192 478 5 252
0 0 0 23 428
0 0 0 0
0 1
1 0

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

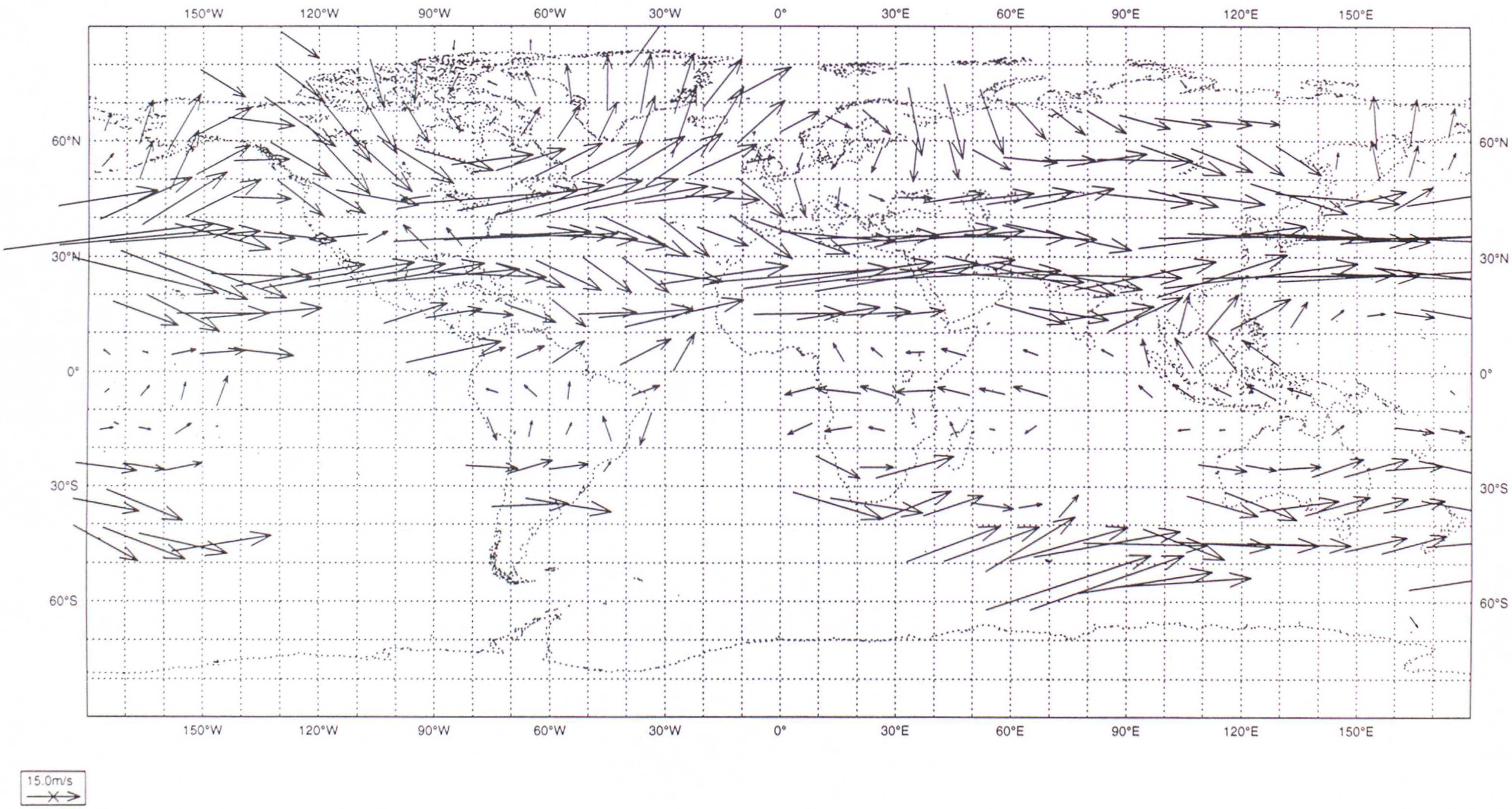

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

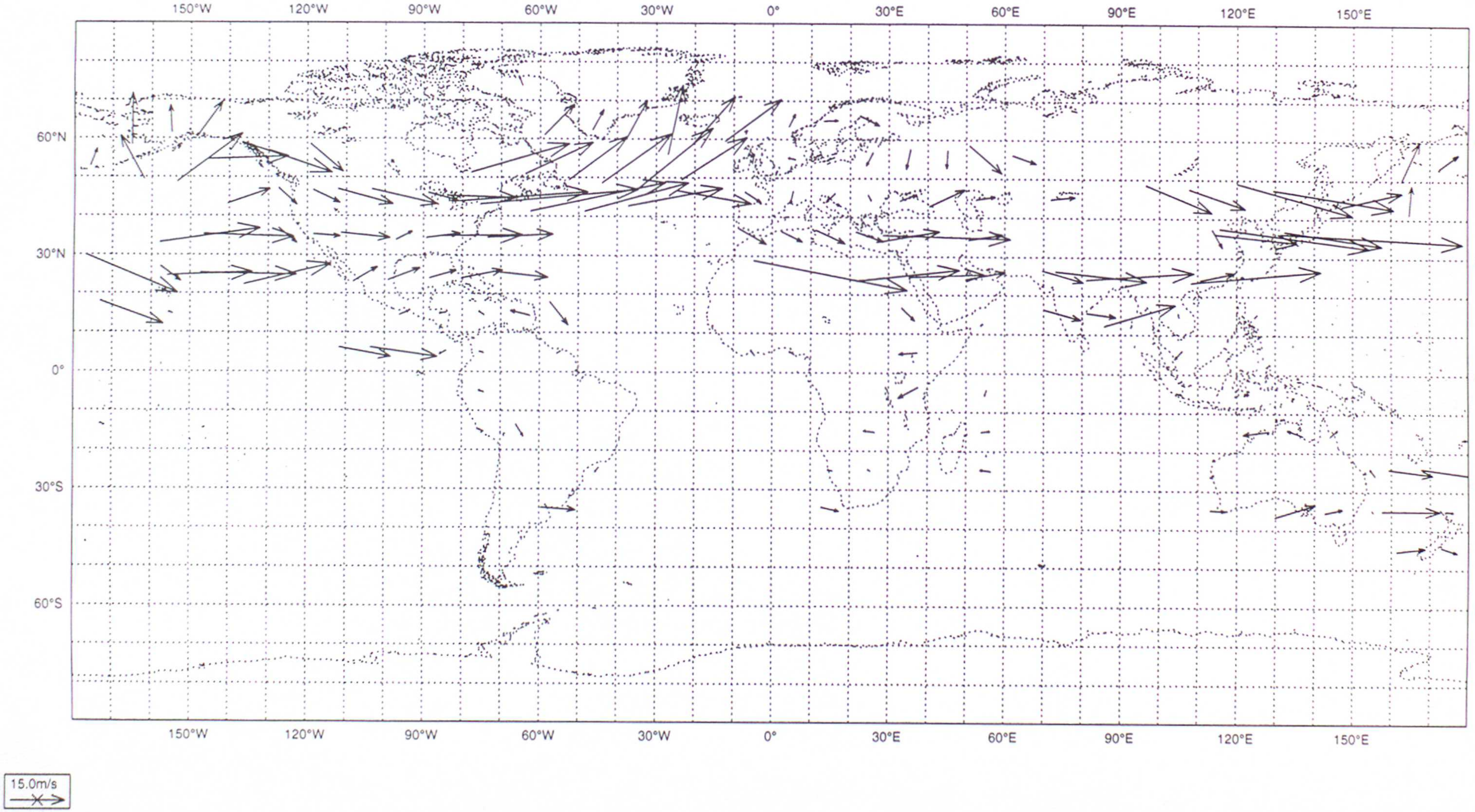

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

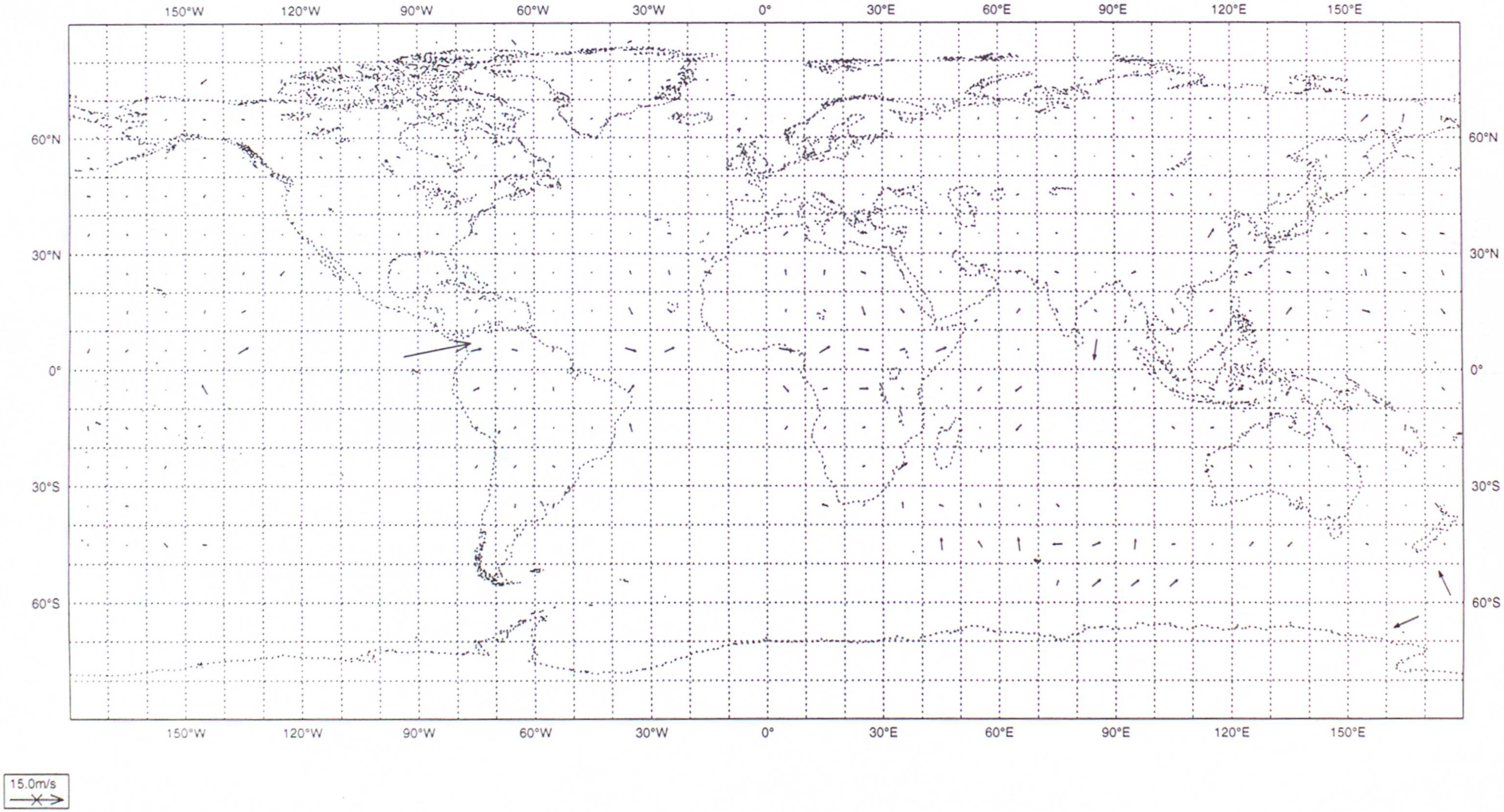

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

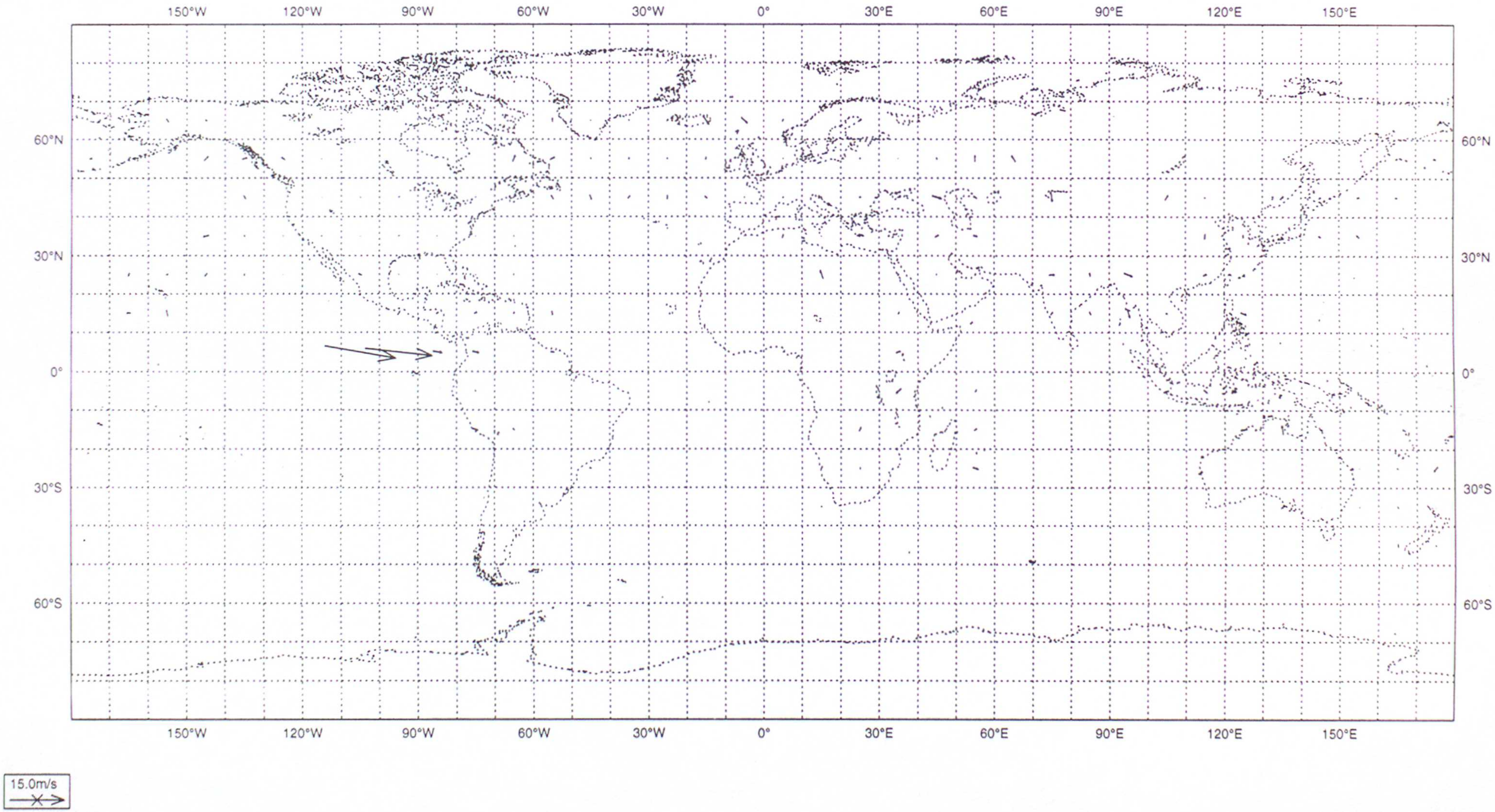

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

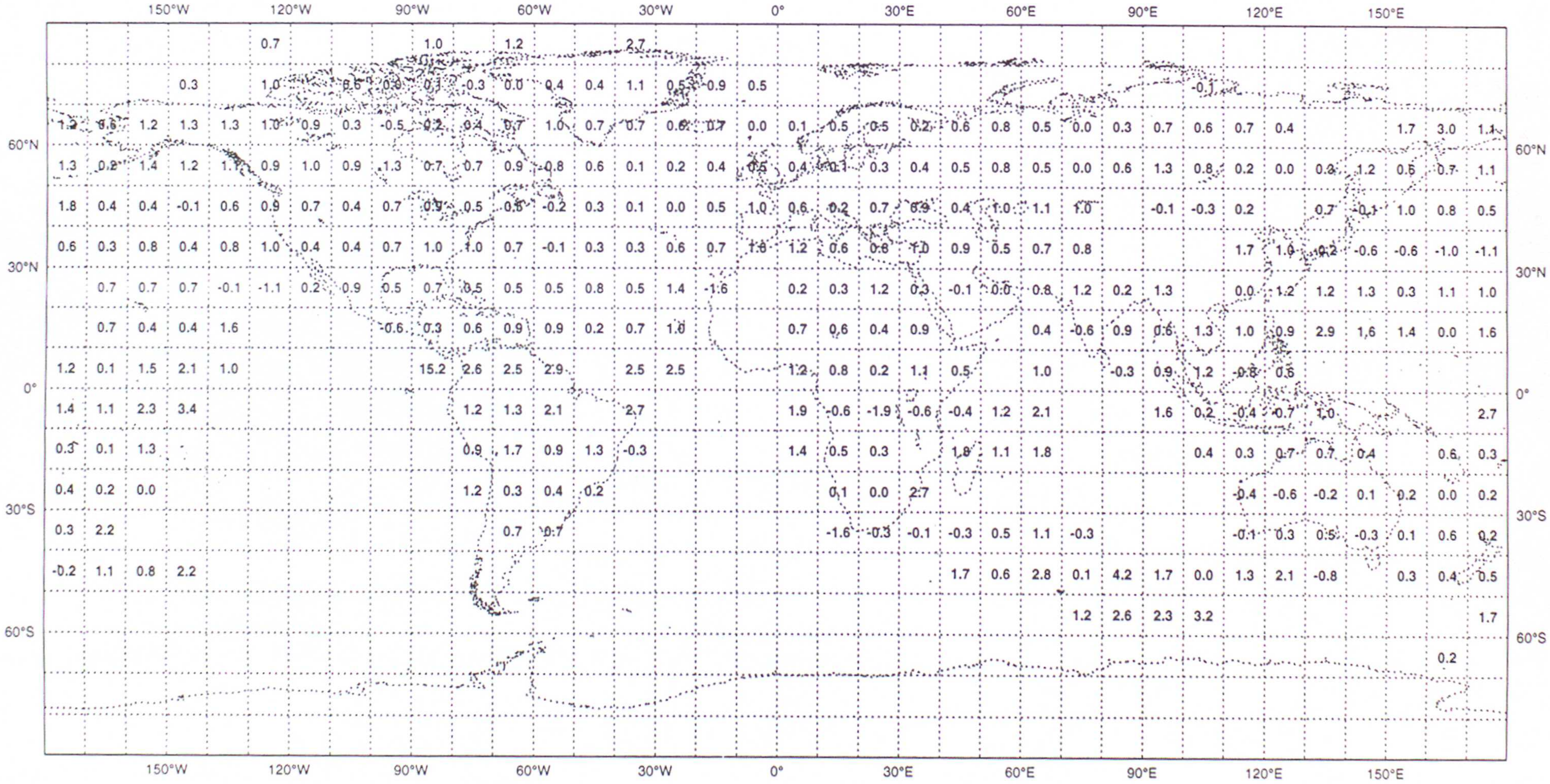

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0.7 1.0 1.2 2.7
0.3 1.0 0.6 0.0 0.1 -0.3 0.0 0.4 0.4 1.1 0.5 -0.9 0.5 -0.1
1.2 0.6 1.2 1.3 1.3 1.0 0.9 0.3 -0.5 0.2 0.4 0.7 1.0 0.7 0.7 0.6 0.7 0.0 0.1 0.5 0.5 0.2 0.6 0.8 0.5 0.0 0.3 0.7 0.6 0.7 0.4 1.7 3.0 1.1
1.3 0.2 1.4 1.2 1.1 0.9 1.0 0.9 1.3 0.7 0.7 0.9 -0.8 0.6 0.1 0.2 0.4 0.5 0.4 0.1 0.3 0.4 0.5 0.8 0.5 0.0 0.6 1.3 0.8 0.2 0.0 0.3 1.2 0.6 0.7 1.1
1.8 0.4 0.4 -0.1 0.6 0.9 0.7 0.4 0.7 0.9 0.5 0.5 -0.2 0.3 0.1 0.0 0.5 1.0 0.6 0.2 0.7 0.9 0.4 1.0 1.1 1.0 -0.1 -0.3 0.2 0.7 -0.1 1.0 0.8 0.5
0.6 0.3 0.8 0.4 0.8 1.0 0.4 0.4 0.7 1.0 1.0 0.7 -0.1 0.3 0.3 0.6 0.7 1.8 1.2 0.6 0.8 1.0 0.9 0.5 0.7 0.8 1.7 1.0 0.2 -0.6 -0.6 -1.0 -1.1
0.7 0.7 0.7 -0.1 -1.1 0.2 0.9 0.5 0.7 0.5 0.5 0.5 0.8 0.5 1.4 -1.6 0.2 0.3 1.2 0.3 -0.1 0.0 0.8 1.2 0.2 1.3 0.0 1.2 1.2 1.3 0.3 1.1 1.0
0.7 0.4 0.4 1.6 -0.6 0.3 0.6 0.9 0.9 0.2 0.7 1.0 0.7 0.6 0.4 0.9 0.4 -0.6 0.9 0.6 1.3 1.0 0.9 2.9 1.6 1.4 0.0 1.6
1.2 0.1 1.5 2.1 1.0 15.2 2.6 2.5 2.9 2.5 2.5 1.2 0.8 0.2 1.1 0.5 1.0 -0.3 0.9 1.2 -0.8 0.6
1.4 1.1 2.3 3.4 1.2 1.3 2.1 2.7 1.9 -0.6 -1.9 -0.6 -0.4 1.2 2.1 1.6 0.2 -0.4 -0.7 1.0 2.7
0.3 0.1 1.3 0.9 1.7 0.9 1.3 -0.3 1.4 0.5 0.3 1.8 1.1 1.8 0.4 0.3 0.7 0.7 0.4 0.6 0.3
0.4 0.2 0.0 1.2 0.3 0.4 0.2 0.1 0.0 2.7 -0.4 -0.6 -0.2 0.1 0.2 0.0 0.2
0.3 2.2 0.7 0.7 -1.6 -0.3 -0.1 -0.3 0.5 1.1 -0.3 -0.1 0.3 0.5 -0.3 0.1 0.6 0.2
-0.2 1.1 0.8 2.2 1.7 0.6 2.8 0.1 4.2 1.7 0.0 1.3 2.1 -0.8 0.3 0.4 0.5
1.2 2.6 2.3 3.2 1.7
0.2

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

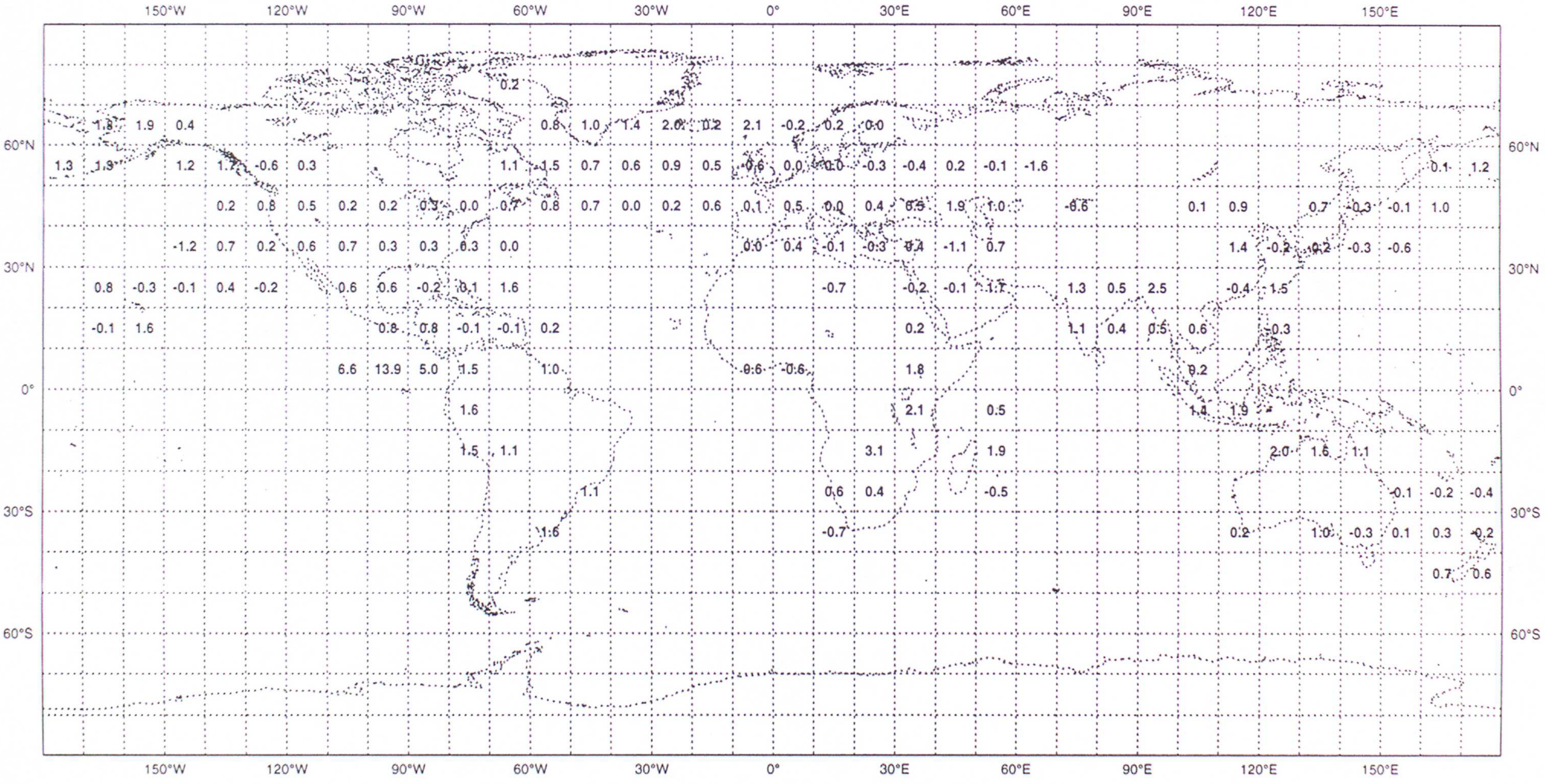

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0.2
1.8 1.9 0.4 0.8 1.0 1.4 2.0 0.2 2.1 -0.2 0.2 0.0
1.3 1.3 1.2 1.7 -0.6 0.3 1.1 -1.5 0.7 0.6 0.9 0.5 -0.6 0.0 0.0 -0.3 -0.4 0.2 -0.1 -1.6 0.1 1.2
0.2 0.8 0.5 0.2 0.2 0.3 0.0 0.7 0.8 0.7 0.0 0.2 0.6 0.1 0.5 0.0 0.4 0.5 1.9 1.0 -0.6 0.1 0.9 0.7 -0.3 -0.1 1.0
-1.2 0.7 0.2 0.6 0.7 0.3 0.3 0.3 0.0 0.0 0.4 -0.1 -0.3 0.4 -1.1 0.7 1.4 -0.2 0.2 -0.3 -0.6
0.8 -0.3 -0.1 0.4 -0.2 -0.6 0.6 -0.2 0.1 1.6 -0.7 -0.2 -0.1 1.7 1.3 0.5 2.5 -0.4 1.5
-0.1 1.6 0.8 0.8 -0.1 -0.1 0.2 0.2 1.1 0.4 0.5 0.6 0.3
6.6 13.9 5.0 1.5 1.0 0.6 -0.6 1.8 0.2
1.6 2.1 0.5 1.4 1.9
1.5 1.1 3.1 1.9 2.0 1.6 1.1
1.1 0.6 0.4 -0.5 -0.1 -0.2 -0.4
1.6 -0.7 0.2 1.0 -0.3 0.1 0.3 -0.2
0.7 0.6

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

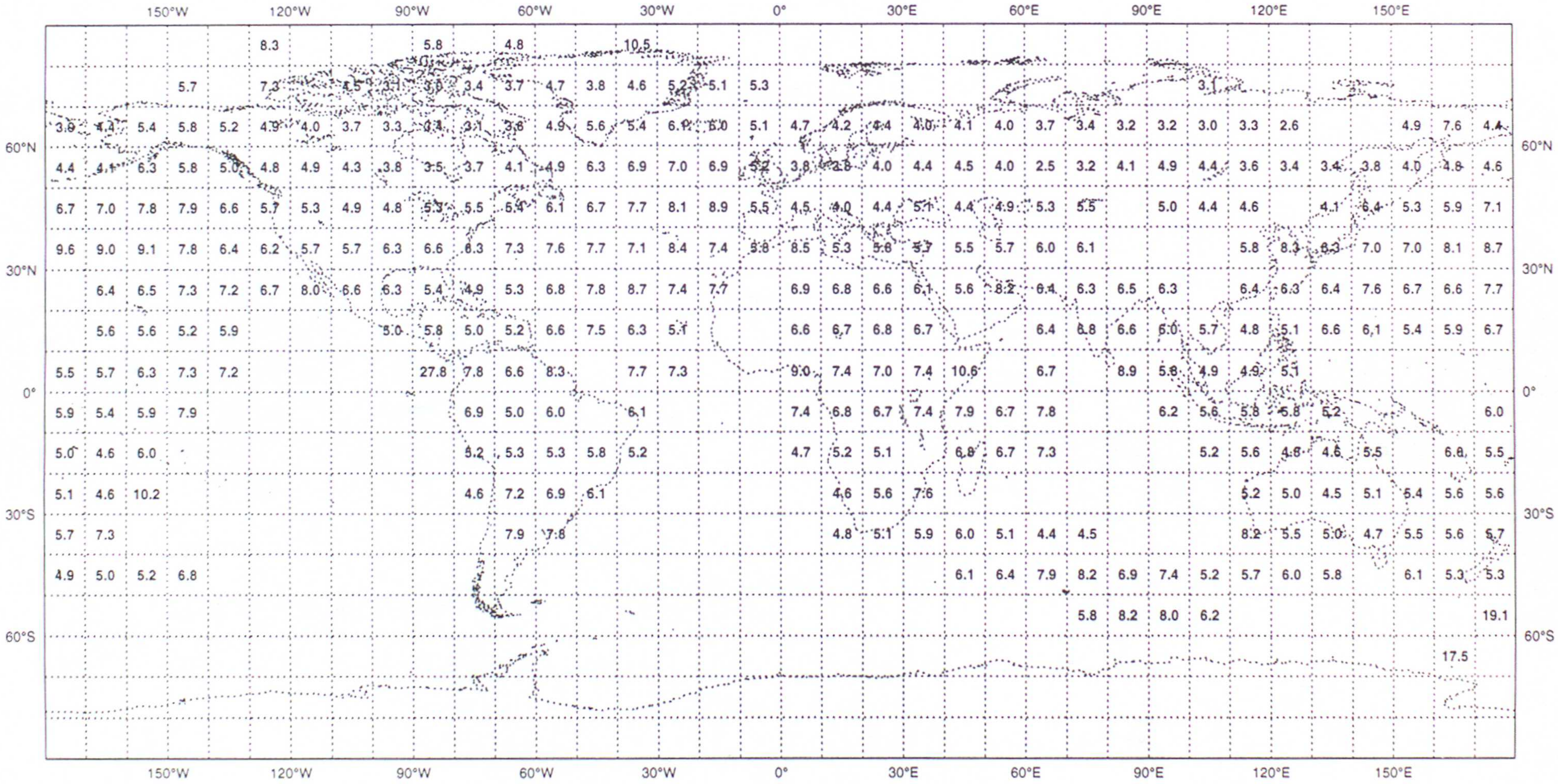

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
8.3 5.8 4.8 10.5
5.7 7.3 4.5 3.1 3.0 3.4 3.7 4.7 3.8 4.6 5.2 5.1 5.3 3.1
3.9 4.3 5.4 5.8 5.2 4.9 4.0 3.7 3.3 3.4 3.1 3.6 4.9 5.6 5.4 6.1 6.0 5.1 4.7 4.2 4.4 4.0 4.1 4.0 3.7 3.4 3.2 3.2 3.0 3.3 2.6 4.9 7.6 4.4
4.4 4.1 6.3 5.8 5.0 4.8 4.9 4.3 3.8 3.5 3.7 4.1 4.9 6.3 6.9 7.0 6.9 5.2 3.8 2.8 4.0 4.4 4.5 4.0 2.5 3.2 4.1 4.9 4.4 3.6 3.4 3.4 3.8 4.0 4.8 4.6
6.7 7.0 7.8 7.9 6.6 5.7 5.3 4.9 4.8 5.3 5.5 5.4 6.1 6.7 7.7 8.1 8.9 5.5 4.5 4.0 4.4 5.1 4.4 4.9 5.3 5.5 5.0 4.4 4.6 4.1 6.4 5.3 5.9 7.1
9.6 9.0 9.1 7.8 6.4 6.2 5.7 5.7 6.3 6.6 8.3 7.3 7.6 7.7 7.1 8.4 7.4 5.8 8.5 5.3 5.6 5.7 5.5 5.7 6.0 6.1 5.8 8.3 8.3 7.0 7.0 8.1 8.7
6.4 6.5 7.3 7.2 6.7 8.0 6.6 6.3 5.4 4.9 5.3 6.8 7.8 8.7 7.4 7.7 6.9 6.8 6.6 6.1 5.6 8.2 6.4 6.3 6.5 6.3 6.4 6.3 6.4 7.6 6.7 6.6 7.7
5.6 5.6 5.2 5.9 5.0 5.8 5.0 5.2 6.6 7.5 6.3 5.1 6.6 6.7 6.8 6.7 6.4 6.8 6.6 6.0 5.7 4.8 5.1 6.6 6.1 5.4 5.9 6.7
5.5 5.7 6.3 7.3 7.2 27.8 7.8 6.6 8.3 7.7 7.3 9.0 7.4 7.0 7.4 10.6 6.7 8.9 5.8 4.9 4.9 5.1
5.9 5.4 5.9 7.9 6.9 5.0 6.0 6.1 7.4 6.8 6.7 7.4 7.9 6.7 7.8 6.2 5.6 5.8 5.8 5.2 6.0
5.0 4.6 6.0 5.2 5.3 5.3 5.8 5.2 4.7 5.2 5.1 6.8 6.7 7.3 5.2 5.6 4.8 4.6 5.5 6.8 5.5
5.1 4.6 10.2 4.6 7.2 6.9 6.1 4.6 5.6 7.6 5.2 5.0 4.5 5.1 5.4 5.6 5.6
5.7 7.3 7.9 7.8 4.8 5.1 5.9 6.0 5.1 4.4 4.5 8.2 5.5 5.0 4.7 5.5 5.6 5.7
4.9 5.0 5.2 6.8 6.1 6.4 7.9 8.2 6.9 7.4 5.2 5.7 6.0 5.8 6.1 5.3 5.3
5.8 8.2 8.0 6.2 19.1
17.5

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). FEBRUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

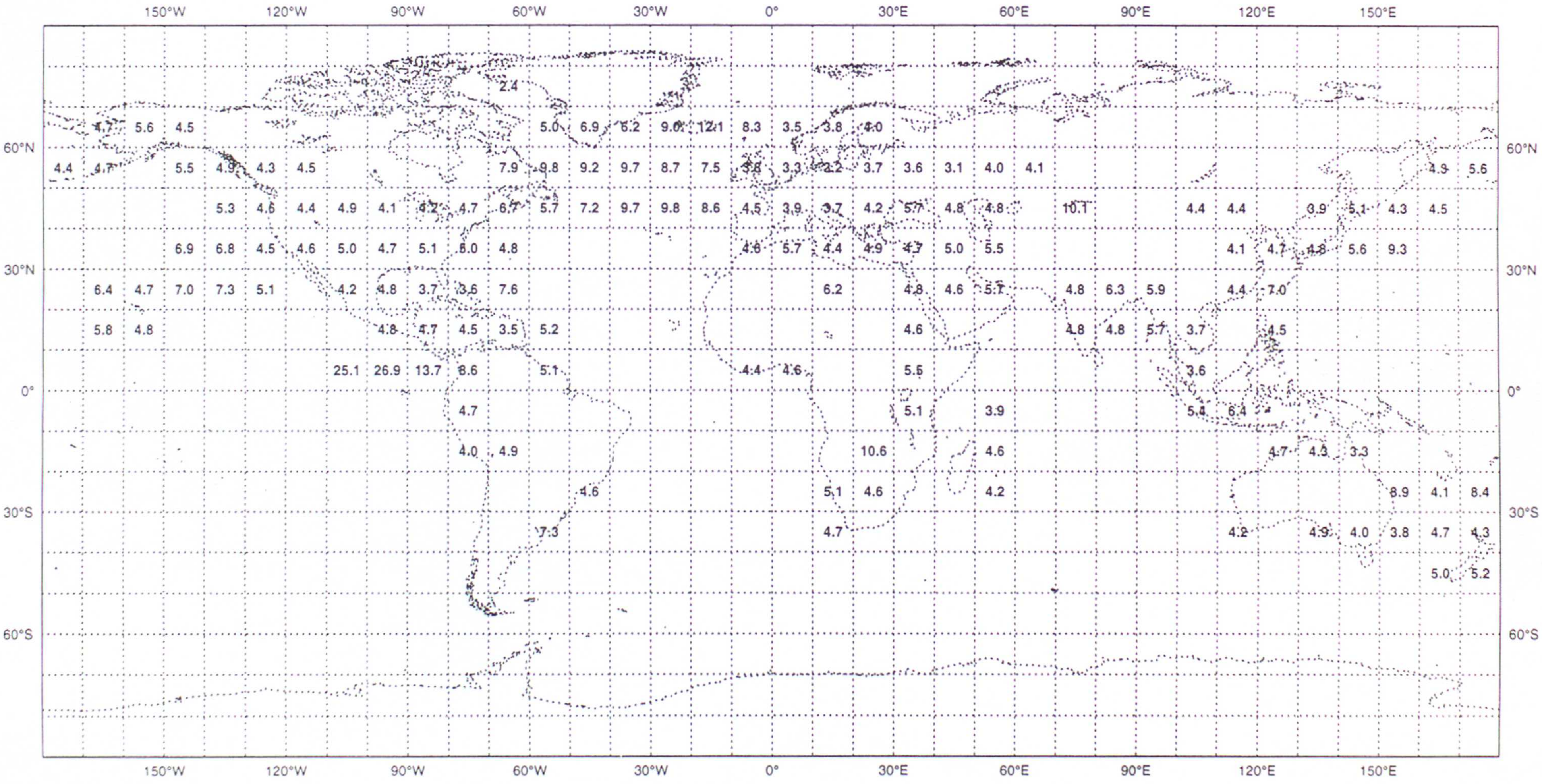

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2.4
4.7 5.6 4.5 5.0 6.9 6.2 9.0 12.1 8.3 3.5 3.8 4.0
4.4 4.7 5.5 4.9 4.3 4.5 7.9 9.8 9.2 9.7 8.7 7.5 3.8 3.3 2.2 3.7 3.6 3.1 4.0 4.1 4.9 5.6
5.3 4.6 4.4 4.9 4.1 4.2 4.7 6.7 5.7 7.2 9.7 9.8 8.6 4.5 3.9 3.7 4.2 5.7 4.8 4.8 10.1 4.4 4.4 3.9 5.1 4.3 4.5
6.9 6.8 4.5 4.6 5.0 4.7 5.1 6.0 4.8 4.6 5.7 4.4 4.9 4.7 5.0 5.5 4.1 4.7 4.8 5.6 9.3
6.4 4.7 7.0 7.3 5.1 4.2 4.8 3.7 3.6 7.6 6.2 4.8 4.6 5.7 4.8 6.3 5.9 4.4 7.0
5.8 4.8 4.8 4.7 4.5 3.5 5.2 4.6 4.8 4.8 5.7 3.7 4.5
25.1 26.9 13.7 8.6 5.1 4.4 4.6 5.6 3.6
4.7 5.1 3.9 5.4 6.4
4.0 4.9 10.6 4.6 4.7 4.3 3.3
4.6 5.1 4.6 4.2 8.9 4.1 8.4
7.3 4.7 4.2 4.9 4.0 3.8 4.7 4.3
5.0 5.2

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
26477	12	Z	70	56/ 31	11	1	125.5	146.3	192.7	9
28722	00	Z	250	55/ 56	7	5	97.0	69.0	119.1	5
32098	00	Z	200	49/ 143	21	4	59.0	78.2	98.0	6
42027	00	Z	200	34/ 75	18	0	97.4	-51.3	110.1	4
42027	12	Z	150	34/ 75	11	3	118.3	40.9	125.2	6
42101	12	Z	200	30/ 76	17	0	72.6	-64.1	96.9	5
42361	00	Z	1000	26/ 78	14	9	13.1	-81.5	82.5	5
42361	12	Z	1000	26/ 78	7	14	12.0	-82.4	83.3	4
42369	12	Z	150	27/ 81	16	0	114.2	-16.6	115.4	7
42410	00	Z	1000	26/ 92	13	10	10.6	-83.4	84.1	4
42647	12	Z	200	23/ 73	14	0	95.9	40.0	103.9	5
42667	00	Z	200	23/ 77	16	0	54.5	-67.0	86.4	4
42667	12	Z	150	23/ 77	14	0	113.2	-29.1	116.9	6
42724	00	Z	200	24/ 91	15	0	68.5	-90.1	113.1	7
42724	12	Z	70	24/ 91	10	0	114.2	-164.5	200.2	5
42809	12	Z	100	23/ 88	19	0	130.3	22.3	132.2	9
42867	00	Z	200	21/ 79	24	0	57.9	-83.4	101.5	5
43003	00	Z	1000	19/ 73	24	0	13.6	-57.6	59.2	7
43003	12	Z	1000	19/ 73	26	0	14.4	-65.3	66.9	4
43128	00	Z	100	17/ 78	19	1	79.1	-96.7	124.9	4
43150	12	Z	1000	18/ 83	27	0	14.1	-77.6	78.8	4
43192	00	Z	1000	15/ 74	3	22	4.6	-94.3	94.4	7
43279	00	Z	50	13/ 80	10	0	107.9	118.2	160.0	5
43285	12	Z	50	13/ 75	13	0	164.3	118.0	202.3	7
43311	00	Z	200	11/ 73	18	0	58.6	-157.9	168.4	5
43311	12	Z	200	11/ 73	18	0	63.9	-78.5	101.2	4
43333	00	Z	30	12/ 93	9	2	123.5	243.4	273.0	6
43353	00	Z	1000	10/ 76	18	2	10.1	-74.7	75.4	4
43369	00	Z	150	8/ 73	13	0	116.3	28.9	119.9	6
43371	00	Z	150	8/ 77	21	1	75.5	-140.7	159.6	6
43466	12	Z	200	7/ 80	3	0	32.6	107.7	112.5	6
78866	12	Z	700	18/ -63	18	1	23.2	41.4	47.5	7
84628	12	Z	850	-12/ -77	21	0	3.6	-49.1	49.3	4

Figure 8. TEMP 500 hPa geopotential mean daily count. FEBRUARY 2003
All hours
Global average number of observations in 24 hours = 1134

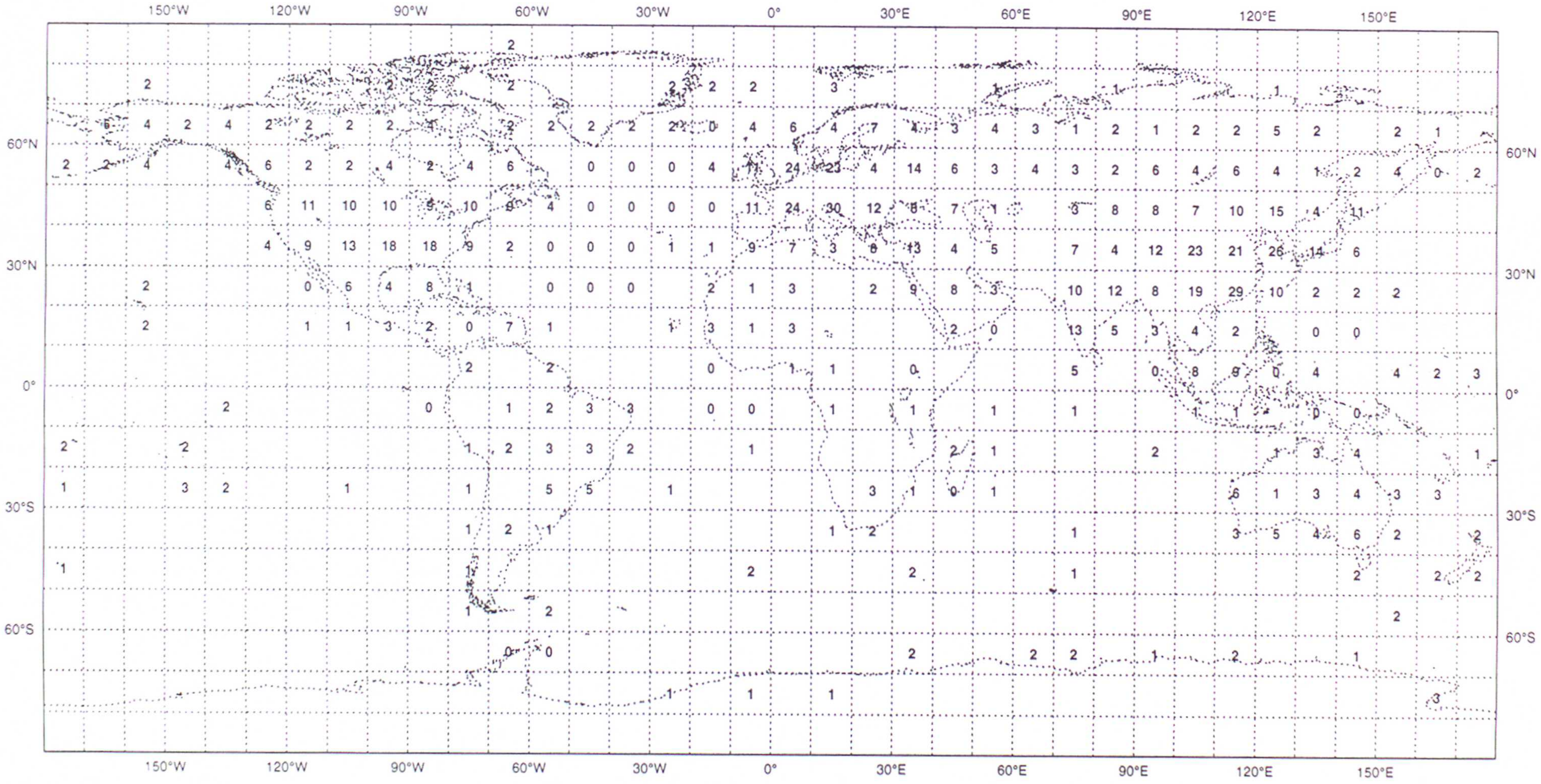

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA : $\geq$ 10 observations and $\geq$ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	150	-5/ -81	11	0	100	0.3	1.4	28.4	3
PSPIU	12	V	200	-5/ -81	10	0	100	1.4	-2.0	30.4	1
07110	12	V	150	48/ -4	26	0	7	-5.7	0.9	21.6	2
17220	12	V	200	38/ 27	26	0	3	-2.5	-1.8	18.3	1
17351	00	V	100	37/ 35	19	0	100	-13.7	-1.7	19.9	3
17351	12	V	150	37/ 35	23	0	100	-9.3	0.9	15.7	1
40582	00	V	150	29/ 48	16	0	12	-7.6	3.5	34.8	1
40706	00	V	250	38/ 46	14	0	7	-2.0	-2.1	15.3	2
40754	12	V	150	36/ 51	20	1	10	-2.7	2.4	25.9	2
40809	12	V	400	33/ 59	13	0	100	-9.3	6.8	16.9	1
41780	12	V	300	25/ 67	11	0	9	-9.5	2.9	16.8	1
42182	00	V	200	29/ 77	21	0	100	-6.4	-6.5	15.6	1
42182	12	V	200	29/ 77	23	0	100	-9.2	-6.5	15.6	2
42410	00	V	300	26/ 92	13	0	100	12.1	9.7	19.3	2
42410	12	V	400	26/ 92	17	0	100	7.2	10.0	26.4	1
42647	12	V	250	23/ 73	12	0	100	16.4	-4.0	18.2	1
42809	12	V	250	23/ 88	12	0	16	-10.4	-6.0	16.7	1
43003	12	V	150	19/ 73	21	0	23	-2.3	4.6	15.3	1
51431	00	V	250	44/ 81	27	0	3	-2.1	-0.1	16.0	1
56146	00	V	150	32/ 100	15	0	100	3.3	7.2	17.3	2
56146	12	V	150	32/ 100	17	0	100	5.3	10.8	16.7	1
58968	12	V	200	25/ 122	27	0	37	-2.1	3.9	20.1	4
60155	00	V	250	34/ -8	26	0	3	0.5	2.0	15.3	1
60360	12	V	200	37/ 8	17	0	100	-7.9	-5.9	19.3	3
60571	00	V	150	31/ -2	22	0	4	-4.6	0.0	25.6	1
60620	12	V	300	28/ 0	12	0	100	-19.5	-1.2	24.3	2
60656	12	V	200	28/ -8	20	0	100	-12.1	-4.5	19.2	4
62337	00	V	150	31/ 34	15	0	100	-12.0	13.7	29.9	4
62337	12	V	200	31/ 34	21	0	100	-11.7	12.7	19.6	4
62378	00	V	200	30/ 31	20	0	100	-26.4	-4.9	28.7	6
62378	12	V	200	30/ 31	22	1	100	-25.9	-5.8	28.4	6
62423	00	V	250	27/ 28	22	0	36	-3.1	5.0	24.0	1
62423	12	V	150	27/ 28	20	0	45	-11.7	0.5	34.2	2
63741	00	V	100	-1/ 37	26	0	73	10.4	0.5	16.2	1
64500	12	V	250	0/ 9	14	0	57	0.6	-3.6	16.4	1
68512	12	V	200	-30/ 18	23	0	100	-13.9	2.0	16.8	1
72208	12	V	500	33/ -80	11	0	9	1.4	5.2	16.5	1
72230	00	V	200	33/ -87	12	0	16	-1.8	3.7	15.4	1
72376	12	V	300	37/-108	25	0	56	-3.4	-1.2	15.1	1
97014	00	V	250	2/ 125	13	0	84	5.3	2.7	15.2	1

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. FEBRUARY 2003
All hours
Global average number of observations in 24 hours = 1300

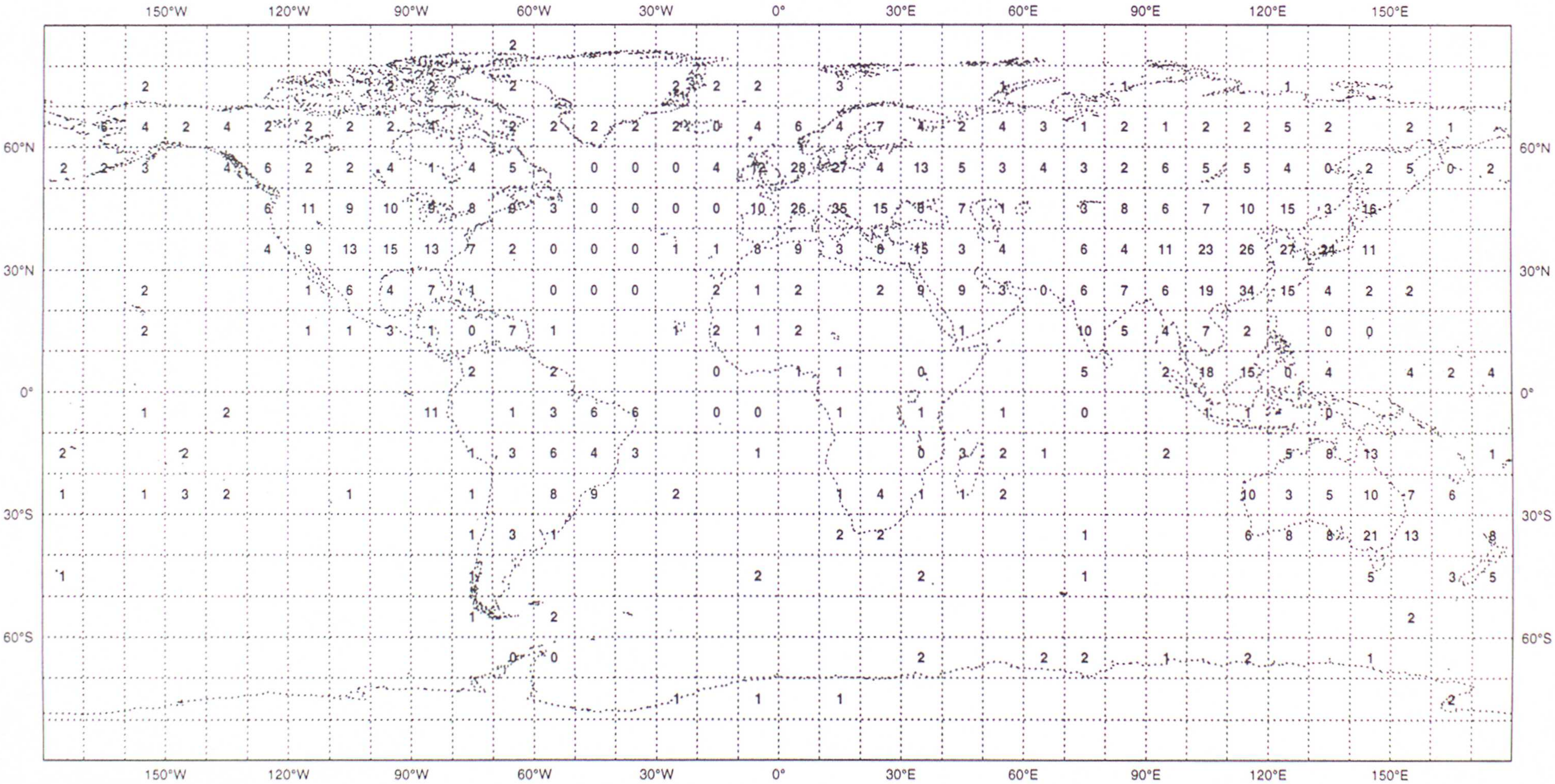

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
2
2 2 2 2 2 2 2 3 1 1 1
6 4 2 4 2 2 2 2 1 2 2 2 2 0 4 6 4 7 4 2 4 3 1 2 1 2 2 5 2 2 1
2 2 3 4 6 2 2 4 1 4 5 0 0 0 4 12 28 27 4 13 5 3 4 3 2 6 5 5 4 0 2 5 0 2
6 11 9 10 5 8 9 3 0 0 0 0 10 26 35 15 8 7 1 3 8 6 7 10 15 3 16
4 9 13 15 13 7 2 0 0 0 1 1 8 9 3 6 15 3 4 6 4 11 23 26 27 24 11
2 1 6 4 7 1 0 0 0 2 1 2 2 9 9 3 0 6 7 6 19 34 15 4 2 2
2 1 1 3 1 0 7 1 1 2 1 2 1 10 5 4 7 2 0 0
2 2 0 1 1 0 5 2 18 15 0 4 4 2 4
1 2 11 1 3 6 6 0 0 1 1 1 0 1 1 0
2 2 1 3 6 4 3 1 0 3 2 1 2 5 8 13 1
1 1 3 2 1 1 8 9 2 1 4 1 1 2 10 3 5 10 7 6
1 3 1 2 2 1 6 8 8 21 13 8
1 1 2 2 1 5 3 5
1 2 2
0 0 2 2 2 1 2 1
1 1 1 2

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
10468	00	DD	52/ 12	22	10.9	4.6	10.3
10468	12	DD	52/ 12	21	12.5	5.0	10.9
33791	12	DD	48/ 33	22	-14.0	3.4	19.5
42027	12	DD	34/ 75	6	-17.5	8.5	8.5
42182	00	DD	29/ 77	22	12.2	4.7	8.4
42182	12	DD	29/ 77	23	10.6	2.3	7.4
42397	12	DD	27/ 88	5	12.6	8.1	8.1
42410	00	DD	26/ 92	10	-14.8	6.5	13.4
56146	12	DD	32/ 100	22	-10.6	8.7	12.8
60360	12	DD	37/ 8	17	14.8	6.7	23.3
60566	12	DD	32/ 4	8	22.8	7.9	20.7
62337	12	DD	31/ 34	21	-15.9	0.7	5.5
67197	12	DD	-25/ 47	5	-10.7	9.1	21.1
82900	12	DD	-8/ -35	15	-10.1	7.8	23.2
83612	12	DD	-20/ -55	12	11.9	7.8	26.4

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: February 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. FEBRUARY 2003
Global average number of observations in 24 hours = 94213

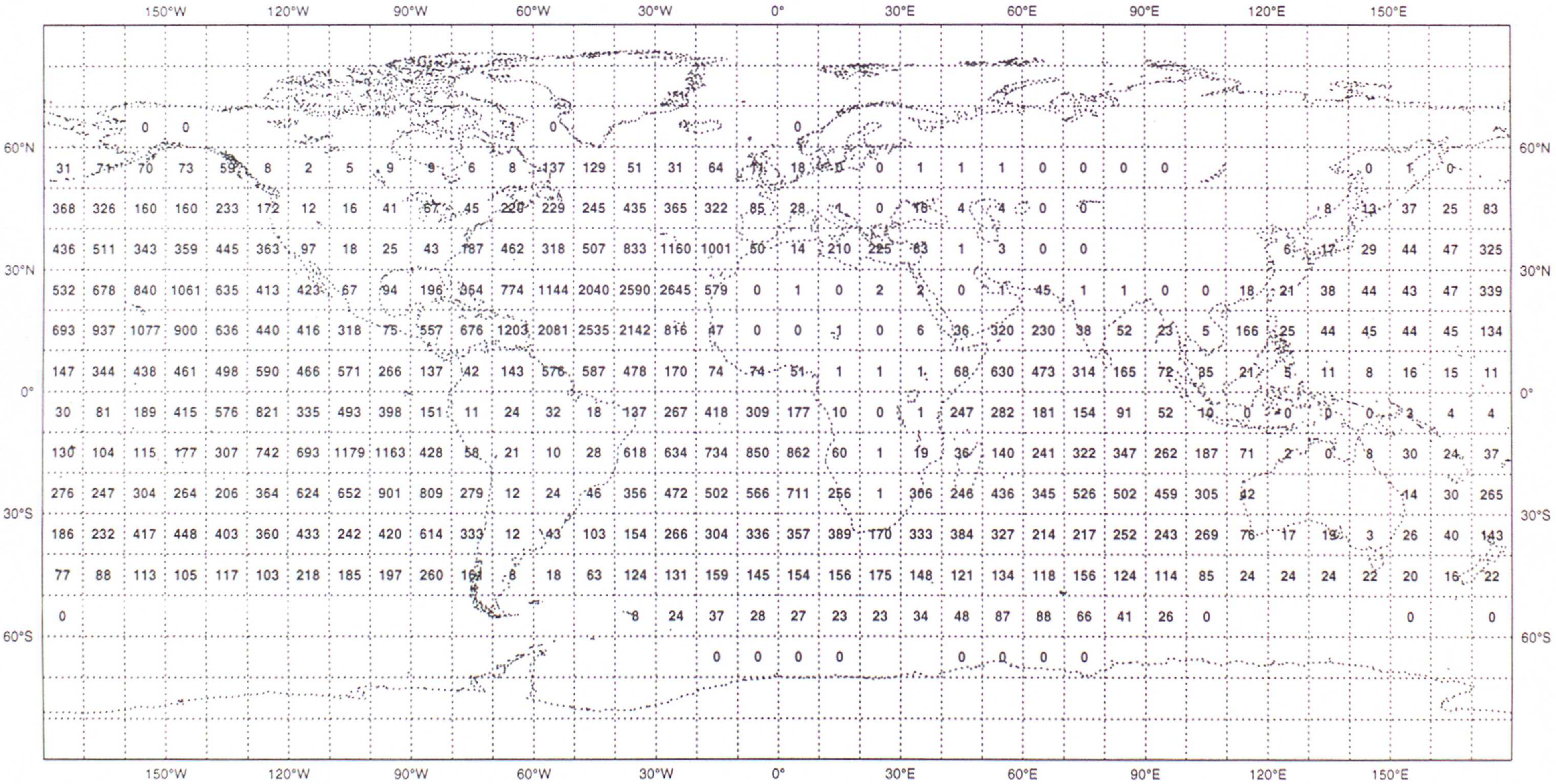

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 1 0 0
31 71 70 73 59 8 2 5 9 9 6 8 137 129 51 31 64 71 18 0 0 1 1 1 0 0 0 0 0 1 0
368 326 160 160 233 172 12 16 41 67 45 220 229 245 435 365 322 85 28 1 0 16 4 4 0 0 8 13 37 25 83
436 511 343 359 445 363 97 18 25 43 187 462 318 507 833 1160 1001 50 14 210 225 63 1 3 0 0 6 17 29 44 47 325
532 678 840 1061 635 413 423 67 94 196 364 774 1144 2040 2590 2645 579 0 1 0 2 2 0 1 45 1 1 0 0 18 21 38 44 43 47 339
693 937 1077 900 636 440 416 318 75 557 676 1203 2081 2535 2142 816 47 0 0 1 0 6 36 320 230 38 52 23 5 166 25 44 45 44 45 134
147 344 438 461 498 590 466 571 266 137 42 143 576 587 478 170 74 74 51 1 1 1 68 630 473 314 165 72 35 21 5 11 8 16 15 11
30 81 189 415 576 821 335 493 398 151 11 24 32 18 137 267 418 309 177 10 0 1 247 282 181 154 91 52 10 0 0 0 0 3 4 4
130 104 115 177 307 742 693 1179 1163 428 58 21 10 28 618 634 734 850 862 60 1 19 36 140 241 322 347 262 187 71 2 0 8 30 24 37
276 247 304 264 206 364 624 652 901 809 279 12 24 46 356 472 502 566 711 256 1 306 246 436 345 526 502 459 305 42 14 30 265
186 232 417 448 403 360 433 242 420 614 333 12 43 103 154 266 304 336 357 389 170 333 384 327 214 217 252 243 269 76 17 19 3 26 40 143
77 88 113 105 117 103 218 185 197 260 164 8 18 63 124 131 159 145 154 156 175 148 121 134 118 156 124 114 85 24 24 24 22 20 16 22
0 8 24 37 28 27 23 23 34 48 87 88 66 41 26 0 0 0
0 0 0 0 0 0 0 0

Figure 11. SATOB 701 - 1000 hPa vector mean wind. FEBRUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

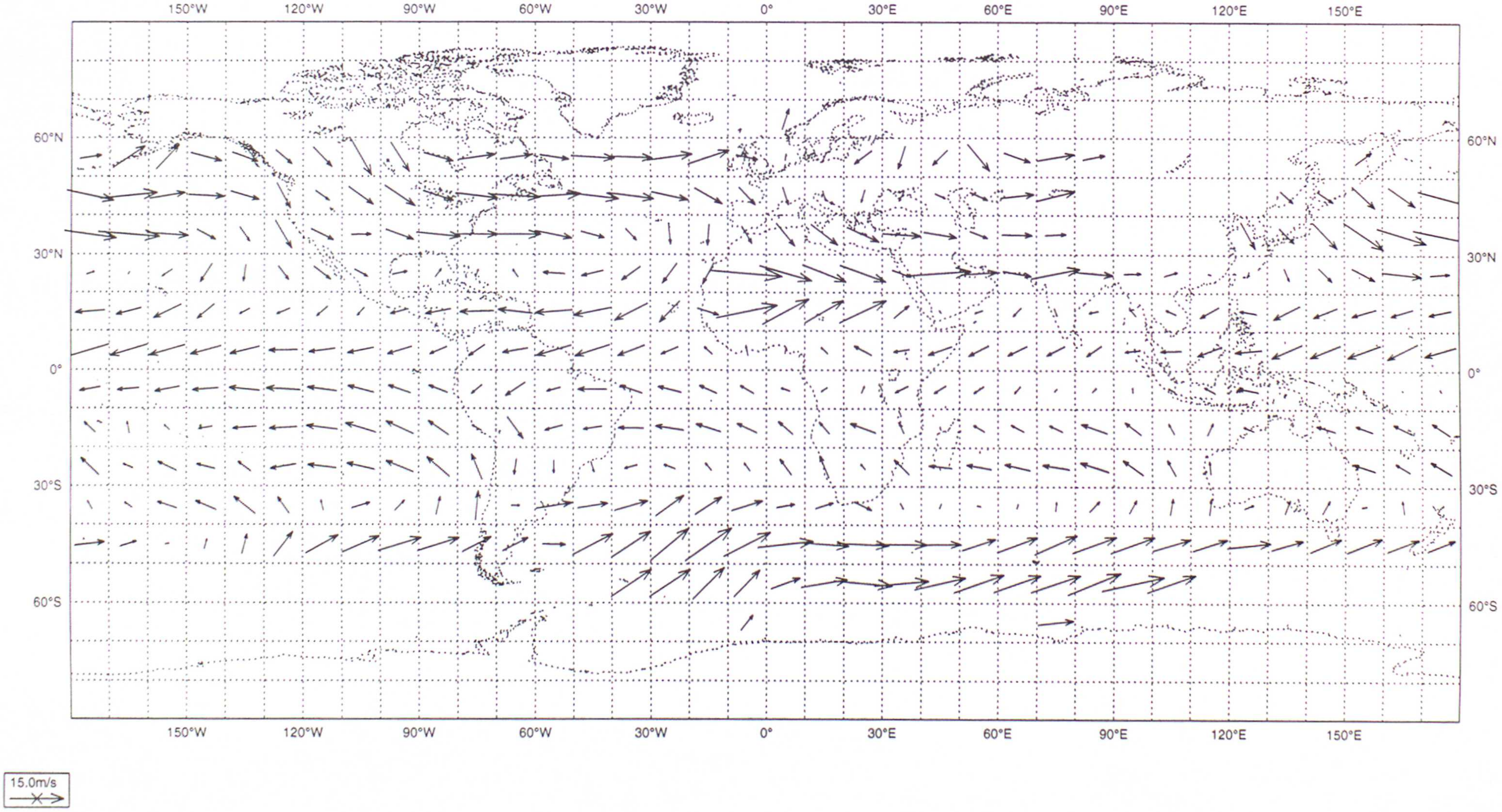

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 12. SATOB 701 - 1000 hPa mean vector wind differences. FEBRUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

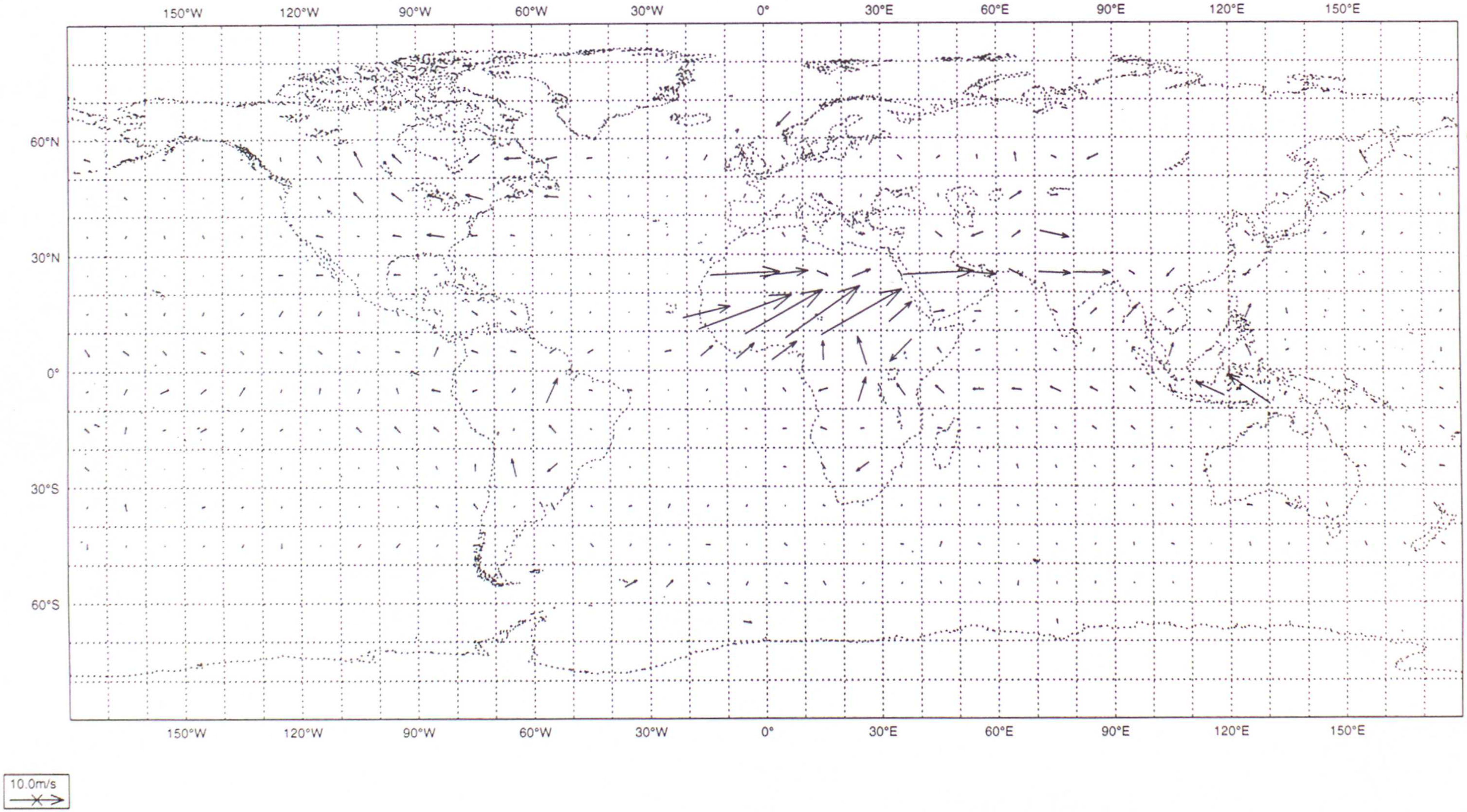

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). FEBRUARY 2003
All observations
Values are plotted where greater than 10 obs are present

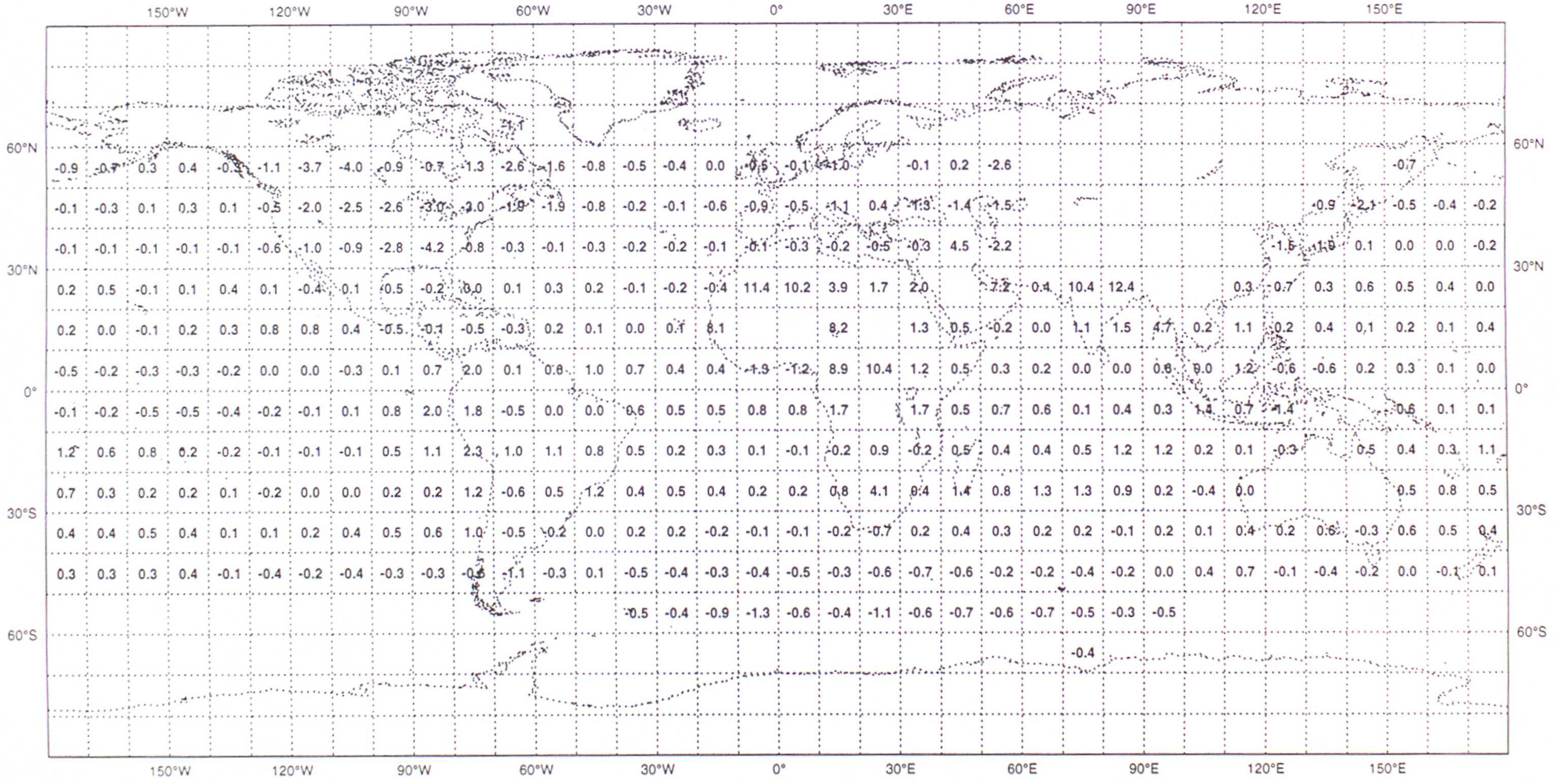

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-1.1
-0.9 -0.7 0.3 0.4 -0.3 -1.1 -3.7 -4.0 -0.9 -0.7 -1.3 -2.6 -1.6 -0.8 -0.5 -0.4 0.0 -0.5 -0.1 -1.0 -0.1 0.2 -2.6 -0.7
-0.1 -0.3 0.1 0.3 0.1 -0.5 -2.0 -2.5 -2.6 -3.0 -3.0 -1.9 -1.9 -0.8 -0.2 -0.1 -0.6 -0.9 -0.5 -1.1 0.4 -1.3 -1.4 -1.5 -0.9 -2.1 -0.5 -0.4 -0.2
-0.1 -0.1 -0.1 -0.1 -0.1 -0.6 -1.0 -0.9 -2.8 -4.2 -0.8 -0.3 -0.1 -0.3 -0.2 -0.2 -0.1 -0.1 -0.3 -0.2 -0.5 -0.3 4.5 -2.2 -1.5 -1.9 0.1 0.0 0.0 -0.2
0.2 0.5 -0.1 0.1 0.4 0.1 -0.4 0.1 0.5 -0.2 0.0 0.1 0.3 0.2 -0.1 -0.2 -0.4 11.4 10.2 3.9 1.7 2.0 7.2 0.4 10.4 12.4 0.3 0.7 0.3 0.6 0.5 0.4 0.0
0.2 0.0 -0.1 0.2 0.3 0.8 0.8 0.4 -0.5 -0.1 -0.5 -0.3 0.2 0.1 0.0 0.1 8.1 8.2 1.3 0.5 -0.2 0.0 1.1 1.5 4.7 0.2 1.1 0.2 0.4 0.1 0.2 0.1 0.4
-0.5 -0.2 -0.3 -0.3 -0.2 0.0 0.0 -0.3 0.1 0.7 2.0 0.1 0.8 1.0 0.7 0.4 0.4 -1.9 -1.2 8.9 10.4 1.2 0.5 0.3 0.2 0.0 0.0 0.6 0.0 1.2 -0.6 -0.6 0.2 0.3 0.1 0.0
-0.1 -0.2 -0.5 -0.5 -0.4 -0.2 -0.1 0.1 0.8 2.0 1.8 -0.5 0.0 0.0 0.6 0.5 0.5 0.8 0.8 1.7 1.7 0.5 0.7 0.6 0.1 0.4 0.3 1.4 0.7 -1.4 0.6 0.1 0.1
1.2 0.6 0.8 0.2 -0.2 -0.1 -0.1 -0.1 0.5 1.1 2.3 1.0 1.1 0.8 0.5 0.2 0.3 0.1 -0.1 -0.2 0.9 -0.2 0.5 0.4 0.4 0.5 1.2 1.2 0.2 0.1 -0.3 0.5 0.4 0.3 1.1
0.7 0.3 0.2 0.2 0.1 -0.2 0.0 0.0 0.2 0.2 1.2 -0.6 0.5 1.2 0.4 0.5 0.4 0.2 0.2 0.8 4.1 0.4 1.4 0.8 1.3 1.3 0.9 0.2 -0.4 0.0 0.5 0.8 0.5
0.4 0.4 0.5 0.4 0.1 0.1 0.2 0.4 0.5 0.6 1.0 -0.5 -0.2 0.0 0.2 0.2 -0.2 -0.1 -0.1 -0.2 -0.7 0.2 0.4 0.3 0.2 0.2 -0.1 0.2 0.1 0.4 0.2 0.6 -0.3 0.6 0.5 0.4
0.3 0.3 0.3 0.4 -0.1 -0.4 -0.2 -0.4 -0.3 -0.3 -0.6 -1.1 -0.3 0.1 -0.5 -0.4 -0.3 -0.4 -0.5 -0.3 -0.6 -0.7 -0.6 -0.2 -0.2 -0.4 -0.2 0.0 0.4 0.7 -0.1 -0.4 -0.2 0.0 -0.1 0.1
-0.5 -0.4 -0.9 -1.3 -0.6 -0.4 -1.1 -0.6 -0.7 -0.6 -0.7 -0.5 -0.3 -0.5
-0.4
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 14. SATOB 701 - 1000 hPa mean RMS O-B vector differences (ms-1). FEBRUARY 2003
All observations
Values are plotted where greater than 10 obs are present

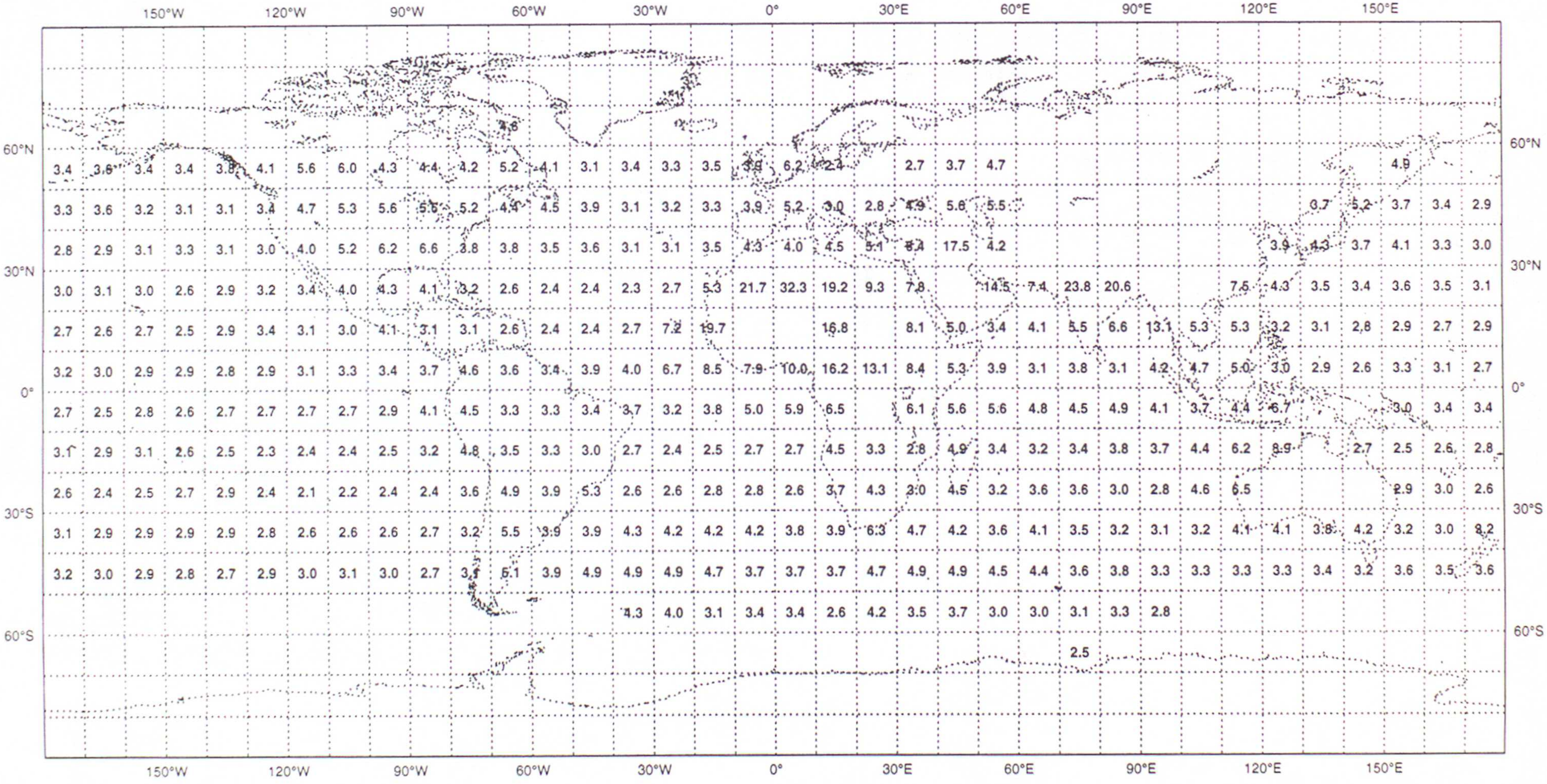
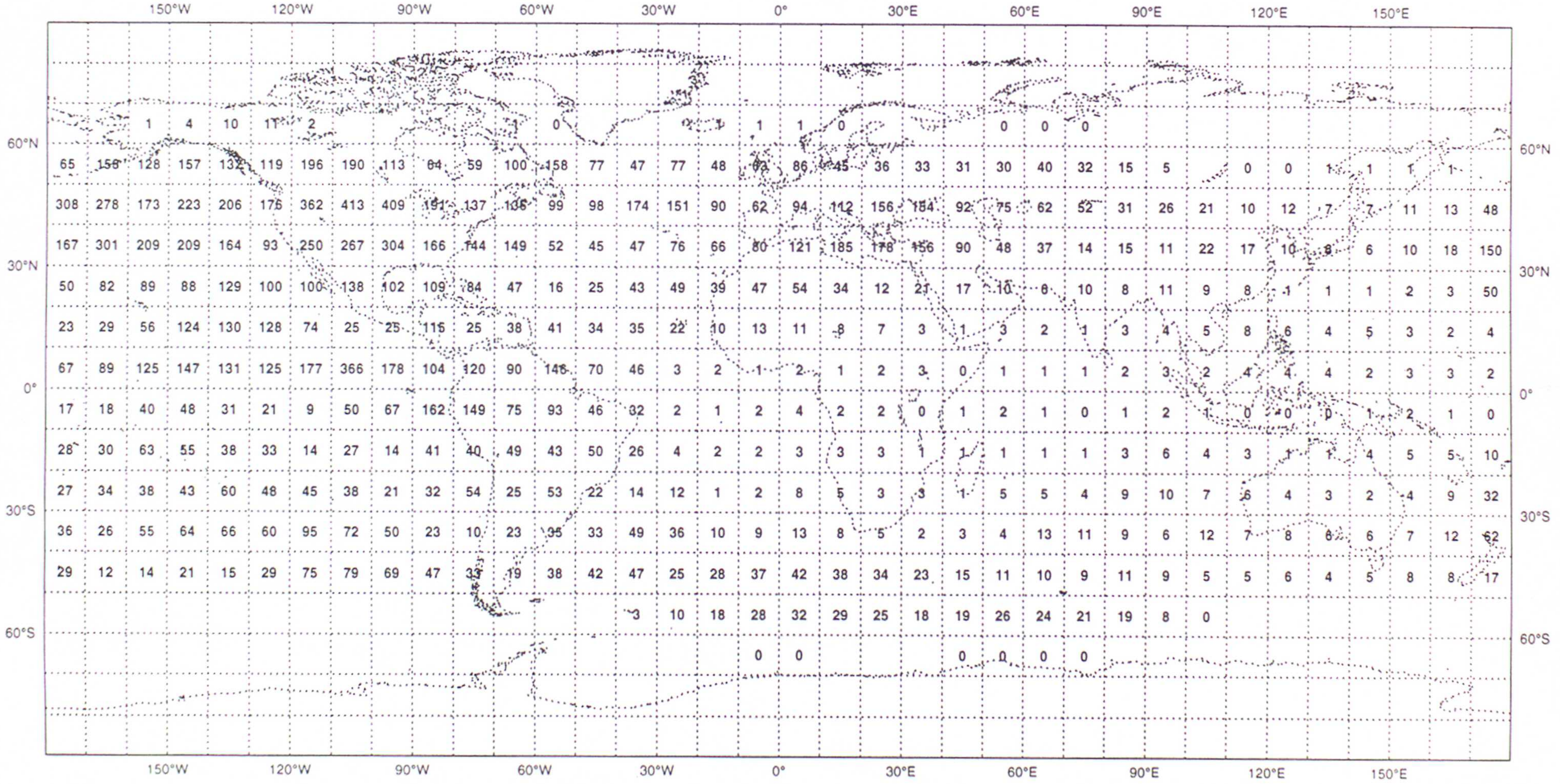

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
4.8
3.4 3.6 3.4 3.4 3.8 4.1 5.6 6.0 4.3 4.4 4.2 5.2 4.1 3.1 3.4 3.3 3.5 3.9 6.2 2.4 2.7 3.7 4.7 4.9
3.3 3.6 3.2 3.1 3.1 3.4 4.7 5.3 5.6 5.5 5.2 4.4 4.5 3.9 3.1 3.2 3.3 3.9 5.2 3.0 2.8 4.9 5.6 5.5 3.7 5.2 3.7 3.4 2.9
2.8 2.9 3.1 3.3 3.1 3.0 4.0 5.2 6.2 6.6 3.8 3.8 3.5 3.6 3.1 3.1 3.5 4.3 4.0 4.5 5.1 8.4 17.5 4.2 3.9 4.3 3.7 4.1 3.3 3.0
3.0 3.1 3.0 2.6 2.9 3.2 3.4 4.0 4.3 4.1 3.2 2.6 2.4 2.4 2.3 2.7 5.3 21.7 32.3 19.2 9.3 7.8 14.5 7.4 23.8 20.6 7.5 4.3 3.5 3.4 3.6 3.5 3.1
2.7 2.6 2.7 2.5 2.9 3.4 3.1 3.0 4.1 3.1 3.1 2.6 2.4 2.4 2.7 7.2 19.7 16.8 8.1 5.0 3.4 4.1 5.5 6.6 13.1 5.3 5.3 3.2 3.1 2.8 2.9 2.7 2.9
3.2 3.0 2.9 2.9 2.8 2.9 3.1 3.3 3.4 3.7 4.6 3.6 3.4 3.9 4.0 6.7 8.5 7.9 10.0 16.2 13.1 8.4 5.3 3.9 3.1 3.8 3.1 4.2 4.7 5.0 3.0 2.9 2.6 3.3 3.1 2.7
2.7 2.5 2.8 2.6 2.7 2.7 2.7 2.7 2.9 4.1 4.5 3.3 3.3 3.4 3.7 3.2 3.8 5.0 5.9 6.5 6.1 5.6 5.6 4.8 4.5 4.9 4.1 3.7 4.4 6.7 3.0 3.4 3.4
3.1 2.9 3.1 2.6 2.5 2.3 2.4 2.4 2.5 3.2 4.8 3.5 3.3 3.0 2.7 2.4 2.5 2.7 2.7 4.5 3.3 2.8 4.9 3.4 3.2 3.4 3.8 3.7 4.4 6.2 8.9 2.7 2.5 2.6 2.8
2.6 2.4 2.5 2.7 2.9 2.4 2.1 2.2 2.4 2.4 3.6 4.9 3.9 5.3 2.6 2.6 2.8 2.8 2.6 3.7 4.3 3.0 4.5 3.2 3.6 3.6 3.0 2.8 4.6 6.5 2.9 3.0 2.6
3.1 2.9 2.9 2.9 2.9 2.8 2.6 2.6 2.6 2.7 3.2 5.5 3.9 3.9 4.3 4.2 4.2 4.2 3.8 3.9 6.3 4.7 4.2 3.6 4.1 3.5 3.2 3.1 3.2 4.1 4.1 3.8 4.2 3.2 3.0 3.2
3.2 3.0 2.9 2.8 2.7 2.9 3.0 3.1 3.0 2.7 3.1 5.1 3.9 4.9 4.9 4.9 4.7 3.7 3.7 3.7 4.7 4.9 4.9 4.5 4.4 3.6 3.8 3.3 3.3 3.3 3.3 3.4 3.2 3.6 3.5 3.6
4.3 4.0 3.1 3.4 3.4 2.6 4.2 3.5 3.7 3.0 3.0 3.1 3.3 2.8
2.5

Figure 15. SATOB 401 - 700 hPa mean daily count. FEBRUARY 2003
Global average number of observations in 24 hours = 19868



		1	4	10	11	2					1	0						1	1	1	0				0	0	0									
65	156	128	157	132	119	196	190	113	84	59	100	158	77	47	77	48	63	86	45	36	33	31	30	40	32	15	5		0	0	1	1	1	1	
308	278	173	223	206	175	362	413	409	191	137	106	99	98	174	151	90	62	94	112	156	154	92	75	62	52	31	26	21	10	12	7	7	11	13	48
167	301	209	209	164	93	250	267	304	166	144	149	52	45	47	76	66	80	121	185	178	156	90	48	37	14	15	11	22	17	10	8	6	10	18	150
50	82	89	88	129	100	100	138	102	109	84	47	16	25	43	49	39	47	54	34	12	21	17	10	6	10	8	11	9	8	1	1	1	2	3	50
23	29	56	124	130	128	74	25	25	115	25	38	41	34	35	22	10	13	11	8	7	3	1	3	2	1	3	4	5	8	6	4	5	3	2	4
67	89	125	147	131	125	177	366	178	104	120	90	146	70	46	3	2	1	2	1	2	3	0	1	1	1	2	3	2	4	4	4	2	3	3	2
17	18	40	48	31	21	9	50	67	162	149	75	93	46	32	2	1	2	4	2	2	0	1	2	1	0	1	2	1	0	0	0	1	2	1	0
28	30	63	55	38	33	14	27	14	41	40	49	43	50	26	4	2	2	3	3	3	1	1	1	1	1	3	6	4	3	1	1	4	5	5	10
27	34	38	43	60	48	45	38	21	32	54	25	53	22	14	12	1	2	8	5	3	3	1	5	5	4	9	10	7	6	4	3	2	4	9	32
36	26	55	64	66	60	95	72	50	23	10	23	35	33	49	36	10	9	13	8	5	2	3	4	13	11	9	6	12	7	8	6	6	7	12	62
29	12	14	21	15	29	75	79	69	47	33	19	38	42	47	25	28	37	42	38	34	23	15	11	10	9	11	9	5	5	6	4	5	8	8	17
														3	10	18	28	32	29	25	18	19	26	24	21	19	8	0							
																	0	0				0	0	0	0										

Figure 16. SATOB 401 - 700 hPa vector mean wind. FEBRUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

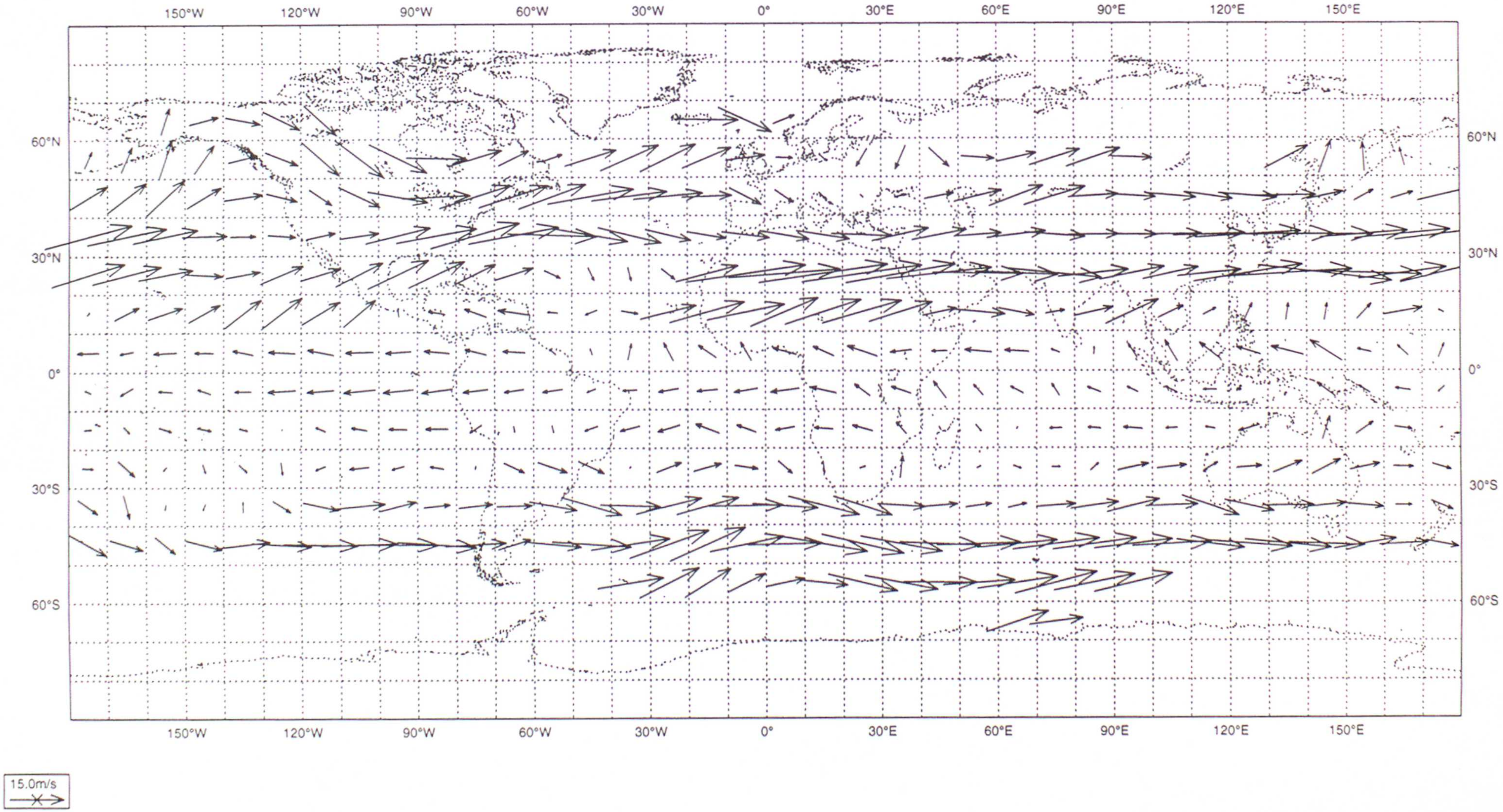

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 17. SATOB 401 - 700 hPa mean vector wind differences. FEBRUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

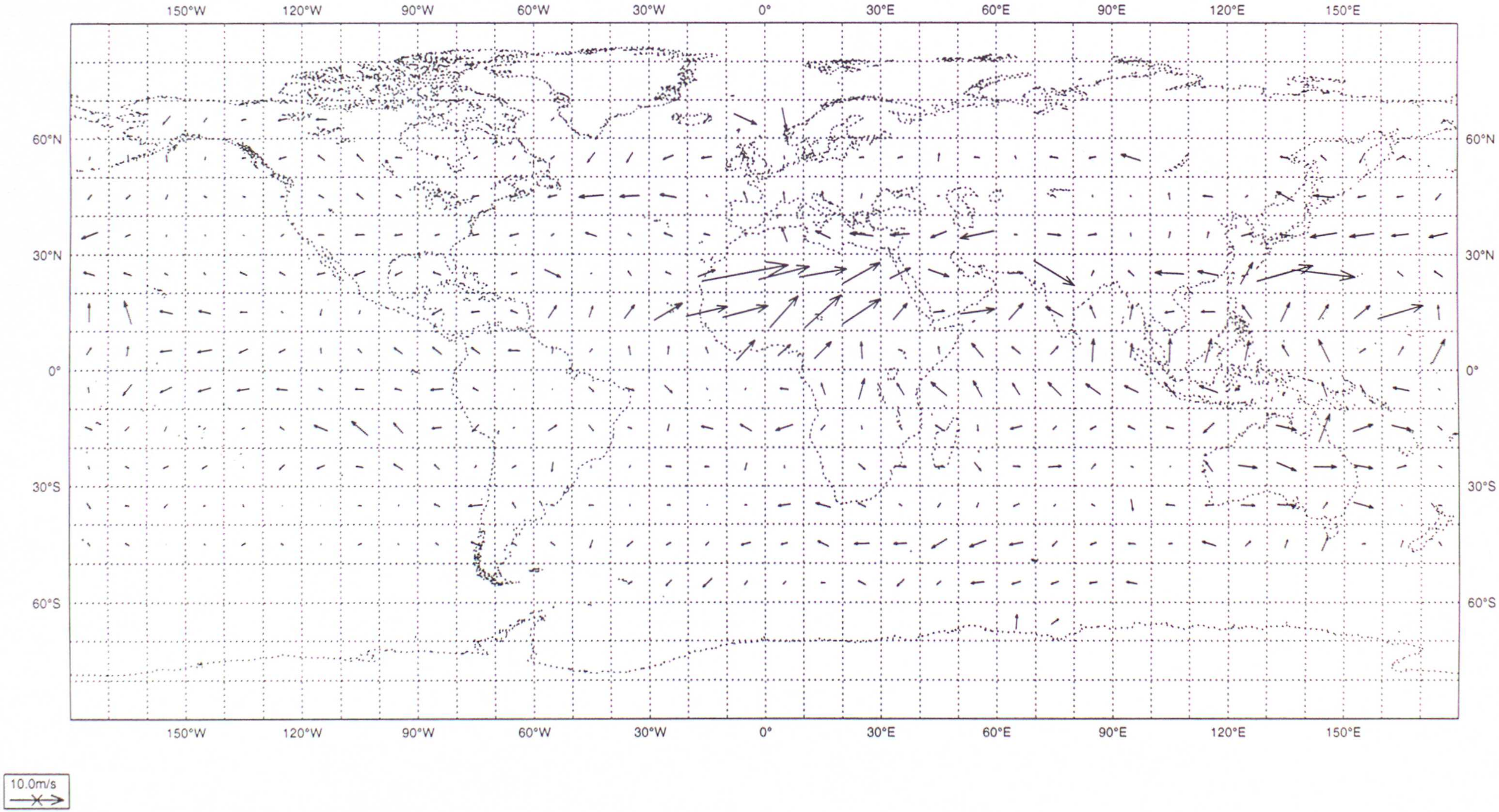

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). FEBRUARY 2003
All observations
Values are plotted where greater than 10 obs are present

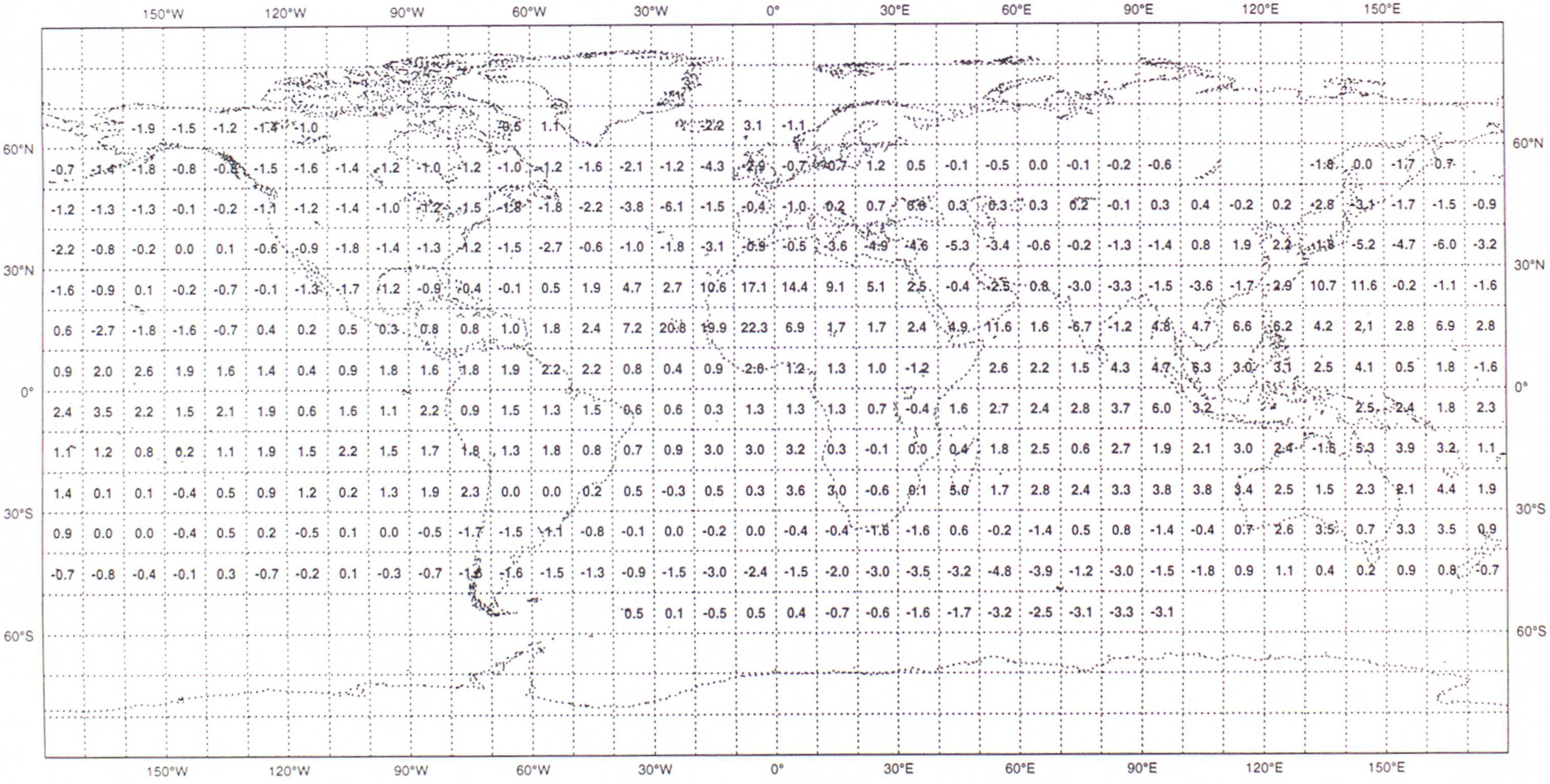

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-1.9 -1.5 -1.2 -1.4 -1.0 0.5 1.1 -2.2 3.1 -1.1
-0.7 -1.4 -1.8 -0.8 -0.8 -1.5 -1.6 -1.4 -1.2 -1.0 -1.2 -1.0 -1.2 -1.6 -2.1 -1.2 -4.3 -2.9 -0.7 -0.7 1.2 0.5 -0.1 -0.5 0.0 -0.1 -0.2 -0.6 -1.8 0.0 -1.7 0.7
-1.2 -1.3 -1.3 -0.1 -0.2 -1.1 -1.2 -1.4 -1.0 -1.2 -1.5 -1.8 -1.8 -2.2 -3.8 -6.1 -1.5 -0.4 -1.0 0.2 0.7 0.8 0.3 0.3 0.3 0.2 -0.1 0.3 0.4 -0.2 0.2 -2.8 -3.1 -1.7 -1.5 -0.9
-2.2 -0.8 -0.2 0.0 0.1 -0.6 -0.9 -1.8 -1.4 -1.3 -1.2 -1.5 -2.7 -0.6 -1.0 -1.8 -3.1 -0.9 -0.5 -3.6 -4.9 -4.6 -5.3 -3.4 -0.6 -0.2 -1.3 -1.4 0.8 1.9 2.2 -1.8 -5.2 -4.7 -6.0 -3.2
-1.6 -0.9 0.1 -0.2 -0.7 -0.1 -1.3 -1.7 1.2 -0.9 -0.4 -0.1 0.5 1.9 4.7 2.7 10.6 17.1 14.4 9.1 5.1 2.5 -0.4 -2.5 0.8 -3.0 -3.3 -1.5 -3.6 -1.7 2.9 10.7 11.6 -0.2 -1.1 -1.6
0.6 -2.7 -1.8 -1.6 -0.7 0.4 0.2 0.5 0.3 0.8 0.8 1.0 1.8 2.4 7.2 20.8 19.9 22.3 6.9 1.7 1.7 2.4 4.9 11.6 1.6 -6.7 -1.2 4.8 4.7 6.6 6.2 4.2 2.1 2.8 6.9 2.8
0.9 2.0 2.6 1.9 1.6 1.4 0.4 0.9 1.8 1.6 1.8 1.9 2.2 2.2 0.8 0.4 0.9 -2.6 1.2 1.3 1.0 -1.2 2.6 2.2 1.5 4.3 4.7 6.3 3.0 3.1 2.5 4.1 0.5 1.8 -1.6
2.4 3.5 2.2 1.5 2.1 1.9 0.6 1.6 1.1 2.2 0.9 1.5 1.3 1.5 0.6 0.6 0.3 1.3 1.3 1.3 0.7 -0.4 1.6 2.7 2.4 2.8 3.7 6.0 3.2 2.5 2.4 1.8 2.3
1.1 1.2 0.8 0.2 1.1 1.9 1.5 2.2 1.5 1.7 1.8 1.3 1.8 0.8 0.7 0.9 3.0 3.0 3.2 0.3 -0.1 0.0 0.4 1.8 2.5 0.6 2.7 1.9 2.1 3.0 2.4 -1.6 5.3 3.9 3.2 1.1
1.4 0.1 0.1 -0.4 0.5 0.9 1.2 0.2 1.3 1.9 2.3 0.0 0.0 0.2 0.5 -0.3 0.5 0.3 3.6 3.0 -0.6 0.1 5.0 1.7 2.8 2.4 3.3 3.8 3.8 3.4 2.5 1.5 2.3 2.1 4.4 1.9
0.9 0.0 0.0 -0.4 0.5 0.2 -0.5 0.1 0.0 -0.5 -1.7 -1.5 -1.1 -0.8 -0.1 0.0 -0.2 0.0 -0.4 -0.4 -1.6 -1.6 0.6 -0.2 -1.4 0.5 0.8 -1.4 -0.4 0.7 2.6 3.5 0.7 3.3 3.5 0.9
-0.7 -0.8 -0.4 -0.1 0.3 -0.7 -0.2 0.1 -0.3 -0.7 -1.5 -1.6 -1.5 -1.3 -0.9 -1.5 -3.0 -2.4 -1.5 -2.0 -3.0 -3.5 -3.2 -4.8 -3.9 -1.2 -3.0 -1.5 -1.8 0.9 1.1 0.4 0.2 0.9 0.8 -0.7
0.5 0.1 -0.5 0.5 0.4 -0.7 -0.6 -1.6 -1.7 -3.2 -2.5 -3.1 -3.3 -3.1

Figure 19. SATOB 401 - 700 hPa mean RMS O-B vector differences (ms-1). FEBRUARY 2003
All observations
Values are plotted where greater than 10 obs are present

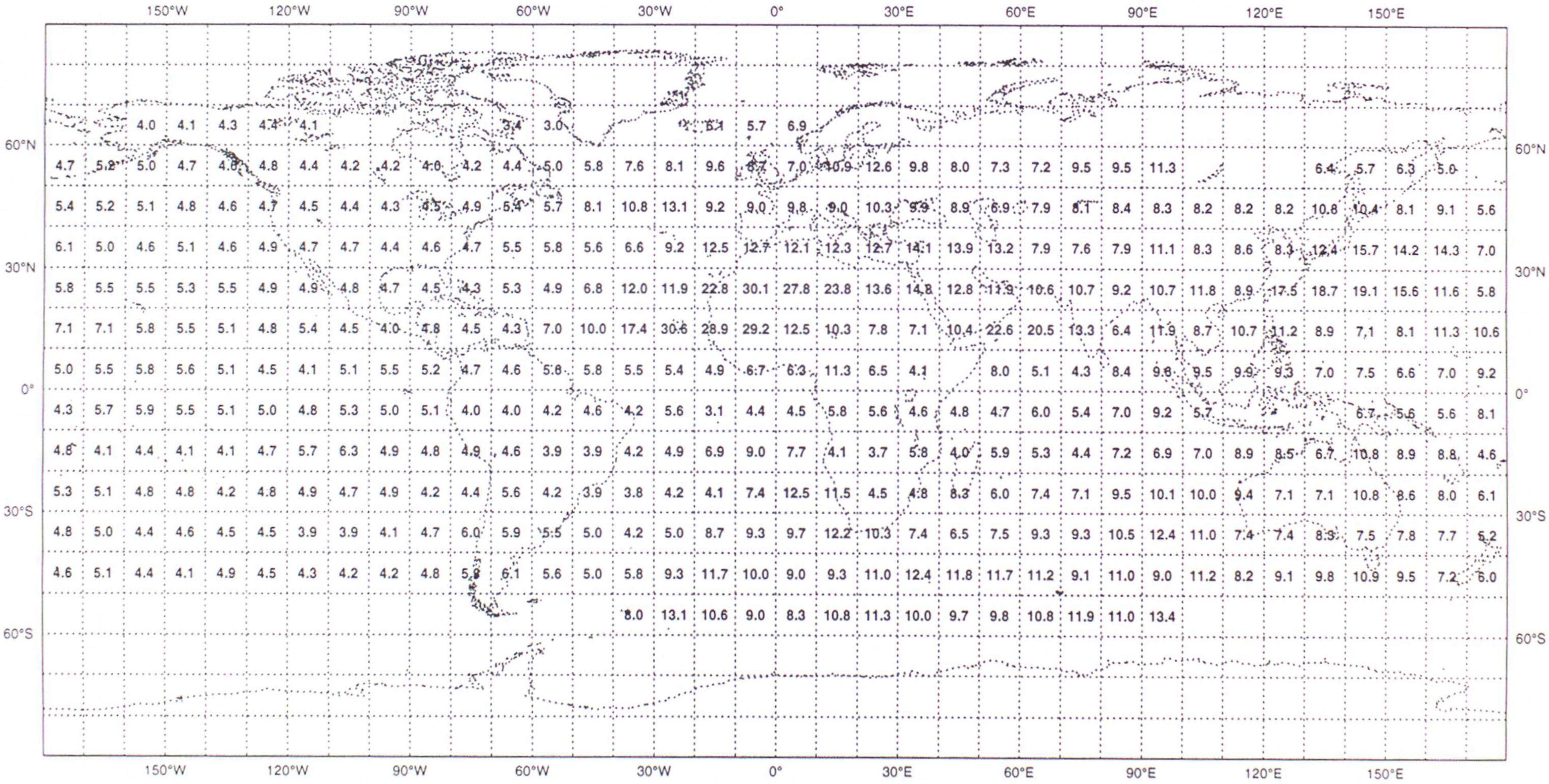
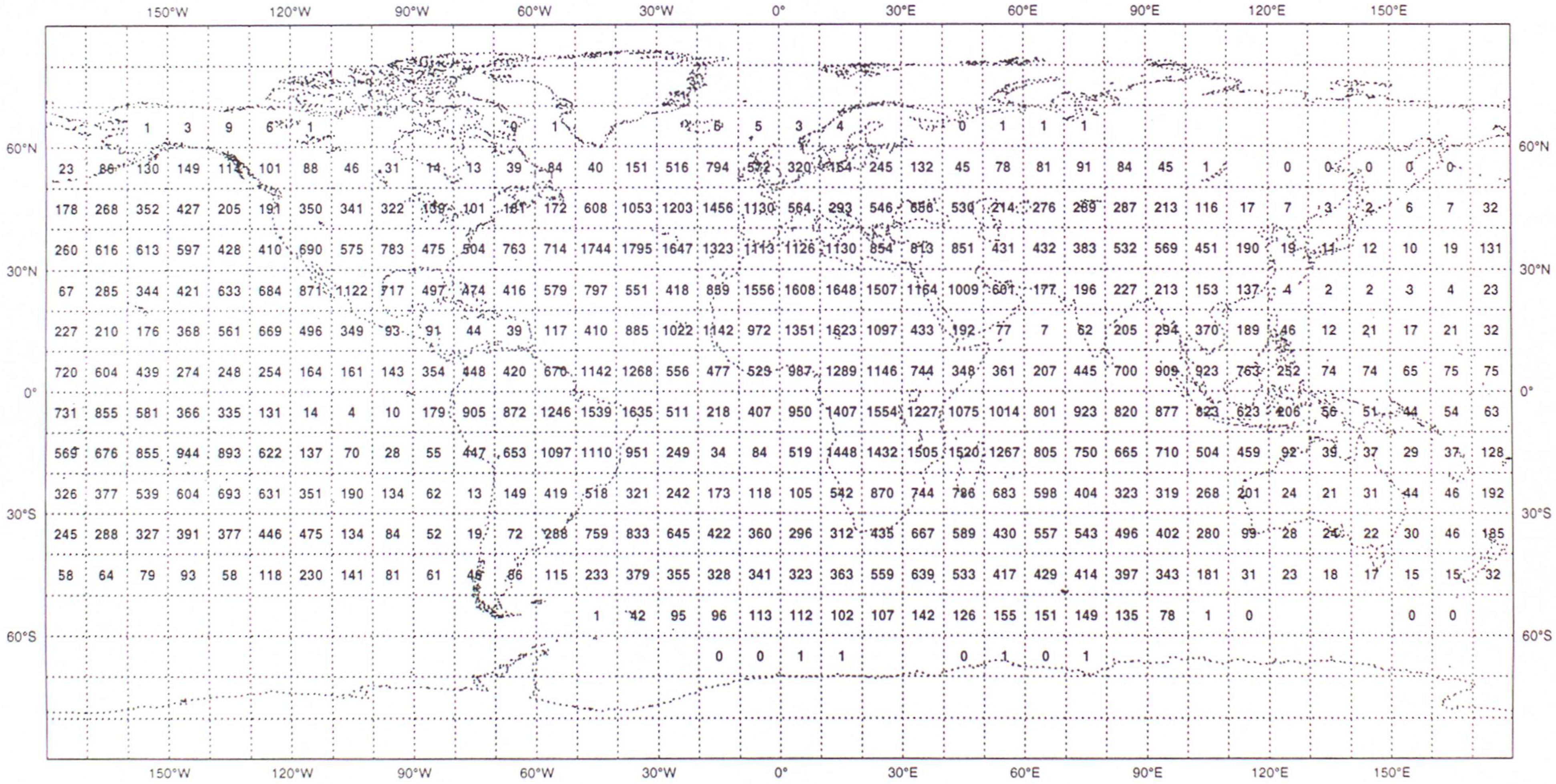

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
4.0 4.1 4.3 4.4 4.1 3.4 3.0 6.1 5.7 6.9
4.7 5.2 5.0 4.7 4.6 4.8 4.4 4.2 4.2 4.0 4.2 4.4 5.0 5.8 7.6 8.1 9.6 8.7 7.0 10.9 12.6 9.8 8.0 7.3 7.2 9.5 9.5 11.3 6.4 5.7 6.3 5.0
5.4 5.2 5.1 4.8 4.6 4.7 4.5 4.4 4.3 4.5 4.9 5.4 5.7 8.1 10.8 13.1 9.2 9.0 9.8 9.0 10.3 9.9 8.9 6.9 7.9 8.1 8.4 8.3 8.2 8.2 8.2 10.8 10.4 8.1 9.1 5.6
6.1 5.0 4.6 5.1 4.6 4.9 4.7 4.7 4.4 4.6 4.7 5.5 5.8 5.6 6.6 9.2 12.5 12.7 12.1 12.3 12.7 14.1 13.9 13.2 7.9 7.6 7.9 11.1 8.3 8.6 8.3 12.4 15.7 14.2 14.3 7.0
5.8 5.5 5.5 5.3 5.5 4.9 4.9 4.8 4.7 4.5 4.3 5.3 4.9 6.8 12.0 11.9 22.8 30.1 27.8 23.8 13.6 14.8 12.8 11.9 10.6 10.7 9.2 10.7 11.8 8.9 17.5 18.7 19.1 15.6 11.6 5.8
7.1 7.1 5.8 5.5 5.1 4.8 5.4 4.5 4.0 4.8 4.5 4.3 7.0 10.0 17.4 30.6 28.9 29.2 12.5 10.3 7.8 7.1 10.4 22.6 20.5 13.3 6.4 11.9 8.7 10.7 11.2 8.9 7.1 8.1 11.3 10.6
5.0 5.5 5.8 5.6 5.1 4.5 4.1 5.1 5.5 5.2 4.7 4.6 5.8 5.8 5.5 5.4 4.9 6.7 6.3 11.3 6.5 4.1 8.0 5.1 4.3 8.4 9.8 9.5 9.9 9.3 7.0 7.5 6.6 7.0 9.2
4.3 5.7 5.9 5.5 5.1 5.0 4.8 5.3 5.0 5.1 4.0 4.0 4.2 4.6 4.2 5.6 3.1 4.4 4.5 5.8 5.6 4.6 4.8 4.7 6.0 5.4 7.0 9.2 5.7 6.7 5.6 5.6 8.1
4.8 4.1 4.4 4.1 4.1 4.7 5.7 6.3 4.9 4.8 4.9 4.6 3.9 3.9 4.2 4.9 6.9 9.0 7.7 4.1 3.7 5.8 4.0 5.9 5.3 4.4 7.2 6.9 7.0 8.9 8.5 6.7 10.8 8.9 8.8 4.6
5.3 5.1 4.8 4.8 4.2 4.8 4.9 4.7 4.9 4.2 4.4 5.6 4.2 3.9 3.8 4.2 4.1 7.4 12.5 11.5 4.5 4.8 8.3 6.0 7.4 7.1 9.5 10.1 10.0 9.4 7.1 7.1 10.8 8.6 8.0 6.1
4.8 5.0 4.4 4.6 4.5 4.5 3.9 3.9 4.1 4.7 6.0 5.9 5.5 5.0 4.2 5.0 8.7 9.3 9.7 12.2 10.3 7.4 6.5 7.5 9.3 9.3 10.5 12.4 11.0 7.4 7.4 8.3 7.5 7.8 7.7 5.2
4.6 5.1 4.4 4.1 4.9 4.5 4.3 4.2 4.2 4.8 5.8 6.1 5.6 5.0 5.8 9.3 11.7 10.0 9.0 9.3 11.0 12.4 11.8 11.7 11.2 9.1 11.0 9.0 11.2 8.2 9.1 9.8 10.9 9.5 7.2 6.0
8.0 13.1 10.6 9.0 8.3 10.8 11.3 10.0 9.7 9.8 10.8 11.9 11.0 13.4

Figure 20. SATOB 101 - 400 hPa mean daily count. FEBRUARY 2003
Global average number of observations in 24 hours = 169729



		1	3	9	6	1					0	1				6	5	3	4			0	1	1	1										
23	86	130	149	112	101	88	46	31	14	13	39	84	40	151	516	794	572	320	154	245	132	45	78	81	91	84	45	1		0	0	0	0	0	
178	268	352	427	205	191	350	341	322	159	101	181	172	608	1053	1203	1456	1130	564	293	546	656	530	214	276	269	287	213	116	17	7	3	2	6	7	32
260	616	613	597	428	410	690	575	783	475	504	763	714	1744	1795	1647	1323	1113	1126	1130	854	813	851	431	432	383	532	569	451	190	19	11	12	10	19	131
67	285	344	421	633	684	871	1122	717	497	474	416	579	797	551	418	859	1556	1608	1648	1507	1164	1009	601	177	196	227	213	153	137	4	2	2	3	4	23
227	210	176	368	561	669	496	349	93	91	44	39	117	410	885	1022	1142	972	1351	1623	1097	433	192	77	7	62	205	294	370	189	46	12	21	17	21	32
720	604	439	274	248	254	164	161	143	354	448	420	670	1142	1268	556	477	529	987	1289	1146	744	348	361	207	445	700	909	923	763	252	74	74	65	75	75
731	855	581	366	335	131	14	4	10	179	905	872	1246	1539	1635	511	218	407	950	1407	1554	1227	1075	1014	801	923	820	877	823	623	206	56	51	44	54	63
569	676	855	944	893	622	137	70	28	55	447	653	1097	1110	951	249	34	84	519	1448	1432	1505	1520	1267	805	750	665	710	504	459	92	39	37	29	37	128
326	377	539	604	693	631	351	190	134	62	13	149	419	518	321	242	173	118	105	542	870	744	786	683	598	404	323	319	268	201	24	21	31	44	46	192
245	288	327	391	377	446	475	134	84	52	19	72	288	759	833	645	422	360	296	312	435	667	589	430	557	543	496	402	280	99	28	24	22	30	46	185
58	64	79	93	58	118	230	141	81	61	46	86	115	233	379	355	328	341	323	363	559	639	533	417	429	414	397	343	181	31	23	18	17	15	15	32
													1	42	95	96	113	112	102	107	142	126	155	151	149	135	78	1	0				0	0	
																0	0	1	1			0	1	0	1										

Figure 21. SATOB 101 - 400 hPa vector mean wind. FEBRUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

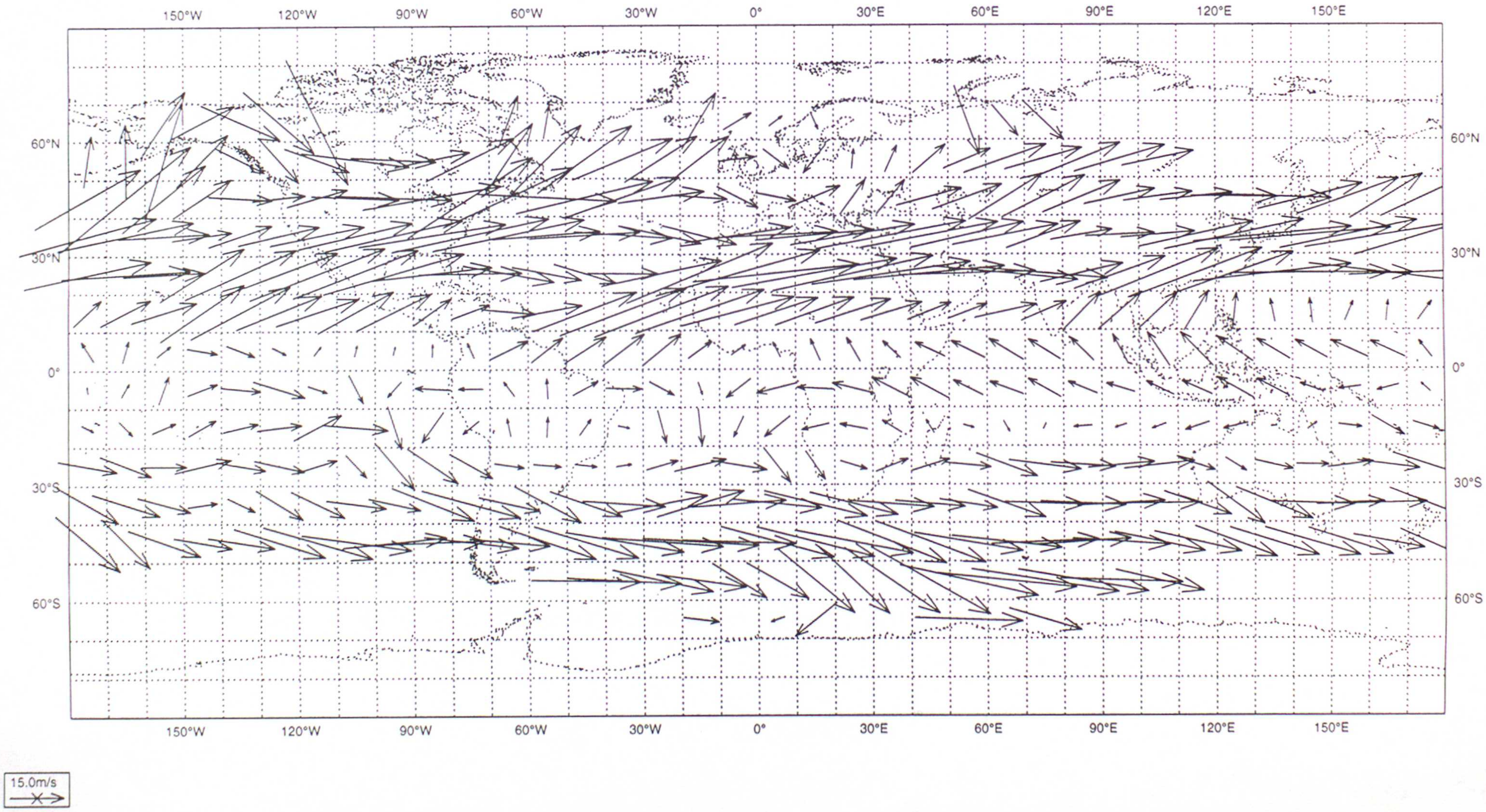

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 22. SATOB 101 - 400 hPa mean vector wind differences. FEBRUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

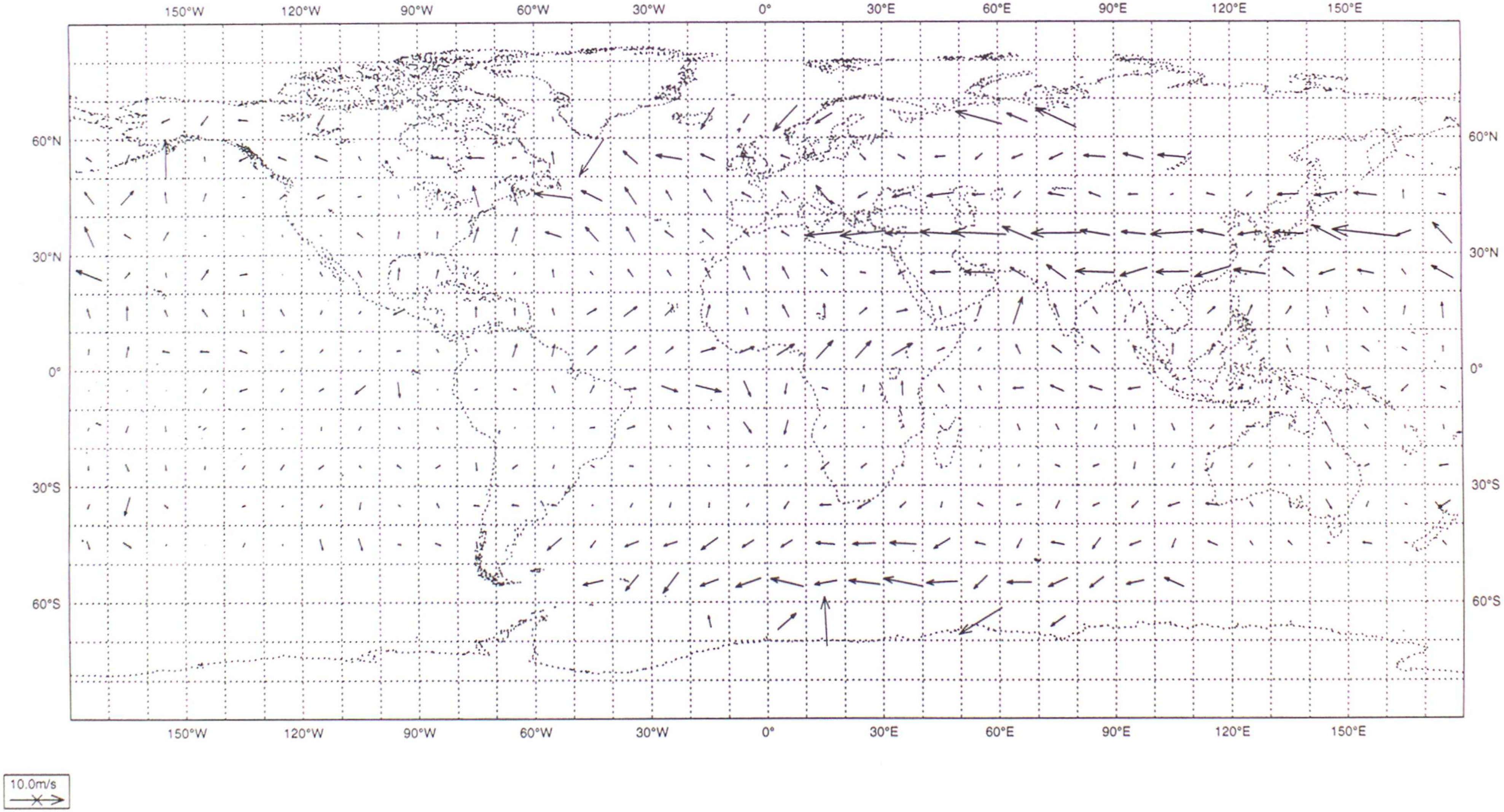

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). FEBRUARY 2003
All observations
Values are plotted where greater than 10 obs are present

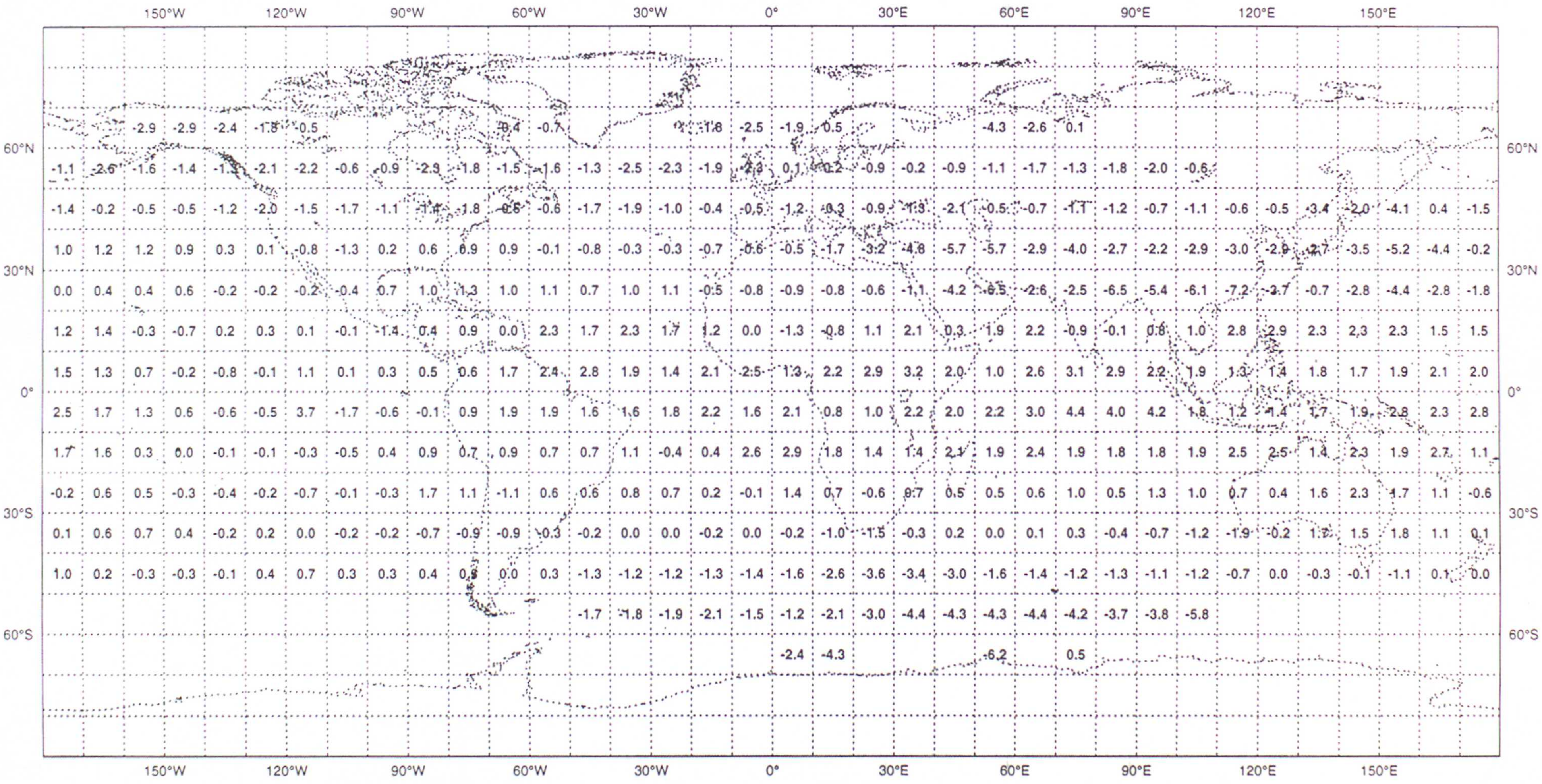
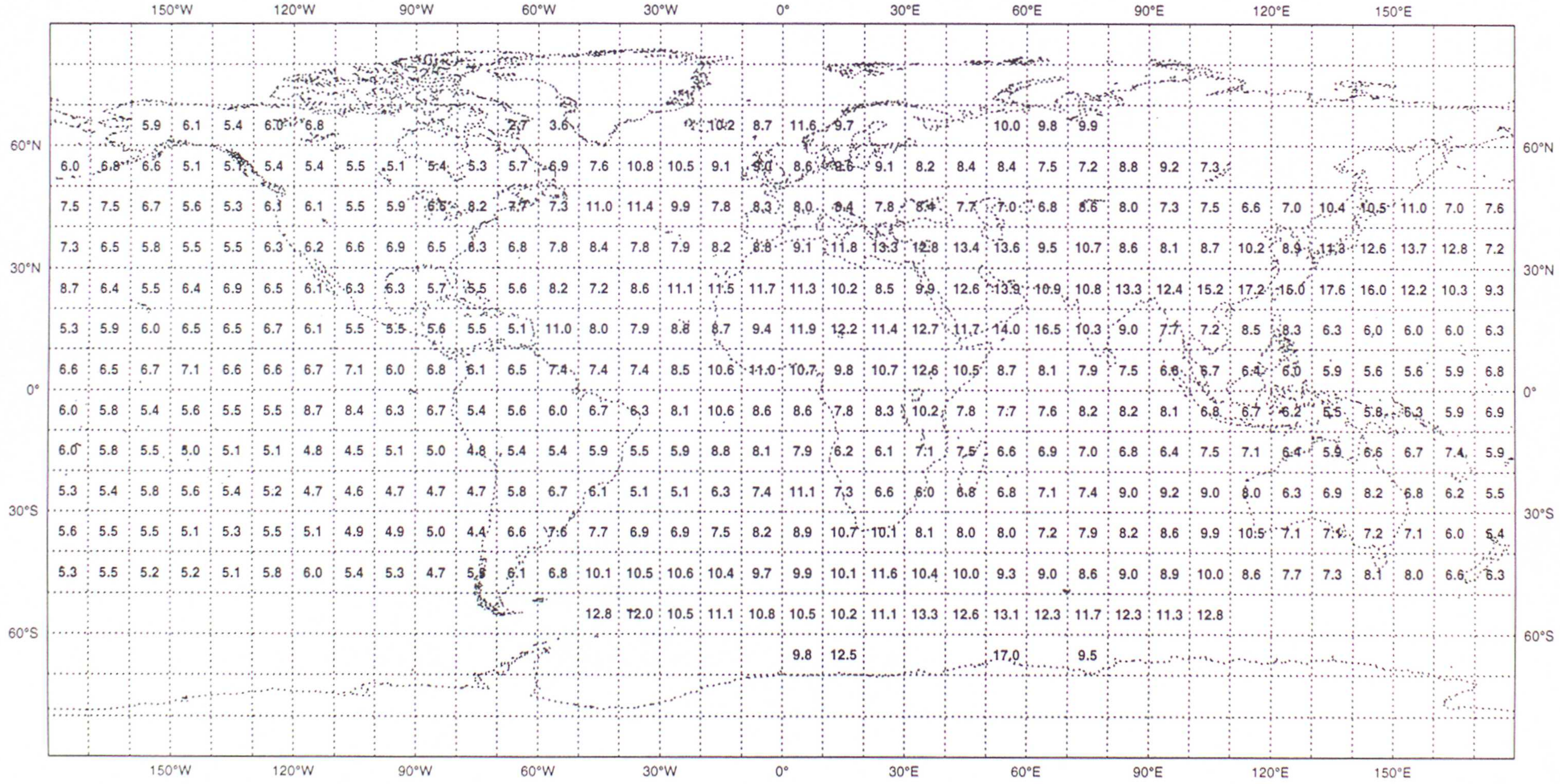

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 24. SATOB 101 - 400 hPa mean RMS O-B vector differences (ms-1). FEBRUARY 2003
All observations
Values are plotted where greater than 10 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5.9 6.1 5.4 6.0 6.8 7.7 3.6 10.2 8.7 11.6 9.7 10.0 9.8 9.9
6.0 6.8 6.6 5.1 5.1 5.4 5.4 5.5 5.1 5.4 5.3 5.7 6.9 7.6 10.8 10.5 9.1 9.0 8.6 8.6 9.1 8.2 8.4 8.4 7.5 7.2 8.8 9.2 7.3
7.5 7.5 6.7 5.6 5.3 6.1 6.1 5.5 5.9 6.5 8.2 7.7 7.3 11.0 11.4 9.9 7.8 8.3 8.0 9.4 7.8 8.4 7.7 7.0 6.8 6.6 8.0 7.3 7.5 6.6 7.0 10.4 10.5 11.0 7.0 7.6
7.3 6.5 5.8 5.5 5.5 6.3 6.2 6.6 6.9 6.5 6.3 6.8 7.8 8.4 7.8 7.9 8.2 8.8 9.1 11.8 13.3 12.8 13.4 13.6 9.5 10.7 8.6 8.1 8.7 10.2 8.9 11.3 12.6 13.7 12.8 7.2
8.7 6.4 5.5 6.4 6.9 6.5 6.1 6.3 6.3 5.7 5.5 5.6 8.2 7.2 8.6 11.1 11.5 11.7 11.3 10.2 8.5 9.9 12.6 13.9 10.9 10.8 13.3 12.4 15.2 17.2 16.0 17.6 16.0 12.2 10.3 9.3
5.3 5.9 6.0 6.5 6.5 6.7 6.1 5.5 5.5 5.6 5.5 5.1 11.0 8.0 7.9 8.8 8.7 9.4 11.9 12.2 11.4 12.7 11.7 14.0 16.5 10.3 9.0 7.7 7.2 8.5 8.3 6.3 6.0 6.0 6.0 6.3
6.6 6.5 6.7 7.1 6.6 6.6 6.7 7.1 6.0 6.8 6.1 6.5 7.4 7.4 7.4 8.5 10.6 11.0 10.7 9.8 10.7 12.6 10.5 8.7 8.1 7.9 7.5 6.6 6.7 6.4 6.0 5.9 5.6 5.6 5.9 6.8
6.0 5.8 5.4 5.6 5.5 5.5 8.7 8.4 6.3 6.7 5.4 5.6 6.0 6.7 6.3 8.1 10.6 8.6 8.6 7.8 8.3 10.2 7.8 7.7 7.6 8.2 8.2 8.1 6.8 6.7 6.2 6.5 5.8 6.3 5.9 6.9
6.0 5.8 5.5 5.0 5.1 5.1 4.8 4.5 5.1 5.0 4.8 5.4 5.4 5.9 5.5 5.9 8.8 8.1 7.9 6.2 6.1 7.1 7.5 6.6 6.9 7.0 6.8 6.4 7.5 7.1 6.4 5.9 6.6 6.7 7.4 5.9
5.3 5.4 5.8 5.6 5.4 5.2 4.7 4.6 4.7 4.7 4.7 5.8 6.7 6.1 5.1 5.1 6.3 7.4 11.1 7.3 6.6 6.0 6.8 6.8 7.1 7.4 9.0 9.2 9.0 8.0 6.3 6.9 8.2 6.8 6.2 5.5
5.6 5.5 5.5 5.1 5.3 5.5 5.1 4.9 4.9 5.0 4.4 6.6 7.6 7.7 6.9 6.9 7.5 8.2 8.9 10.7 10.1 8.1 8.0 8.0 7.2 7.9 8.2 8.6 9.9 10.5 7.1 7.1 7.2 7.1 6.0 5.4
5.3 5.5 5.2 5.2 5.1 5.8 6.0 5.4 5.3 4.7 5.8 6.1 6.8 10.1 10.5 10.6 10.4 9.7 9.9 10.1 11.6 10.4 10.0 9.3 9.0 8.6 9.0 8.9 10.0 8.6 7.7 7.3 8.1 8.0 6.6 6.3
12.8 12.0 10.5 11.1 10.8 10.5 10.2 11.1 13.3 12.6 13.1 12.3 11.7 12.3 11.3 12.8
9.8 12.5 17.0 9.5

MONITORING OF SATELLITE TEMPERATURES

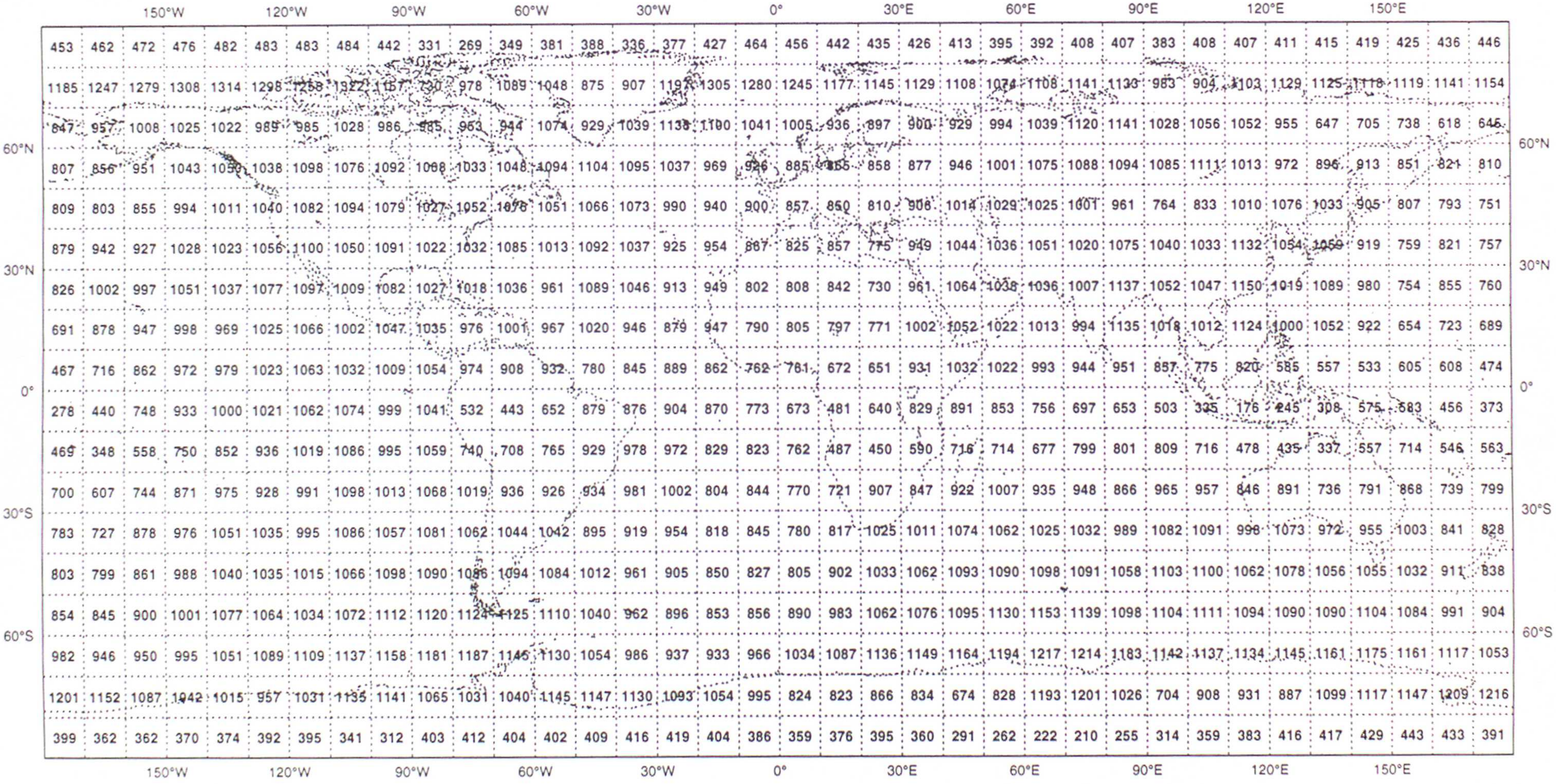
MONITORING CENTRE: BRACKNELL

MONTH: February 2003

Monitoring procedures

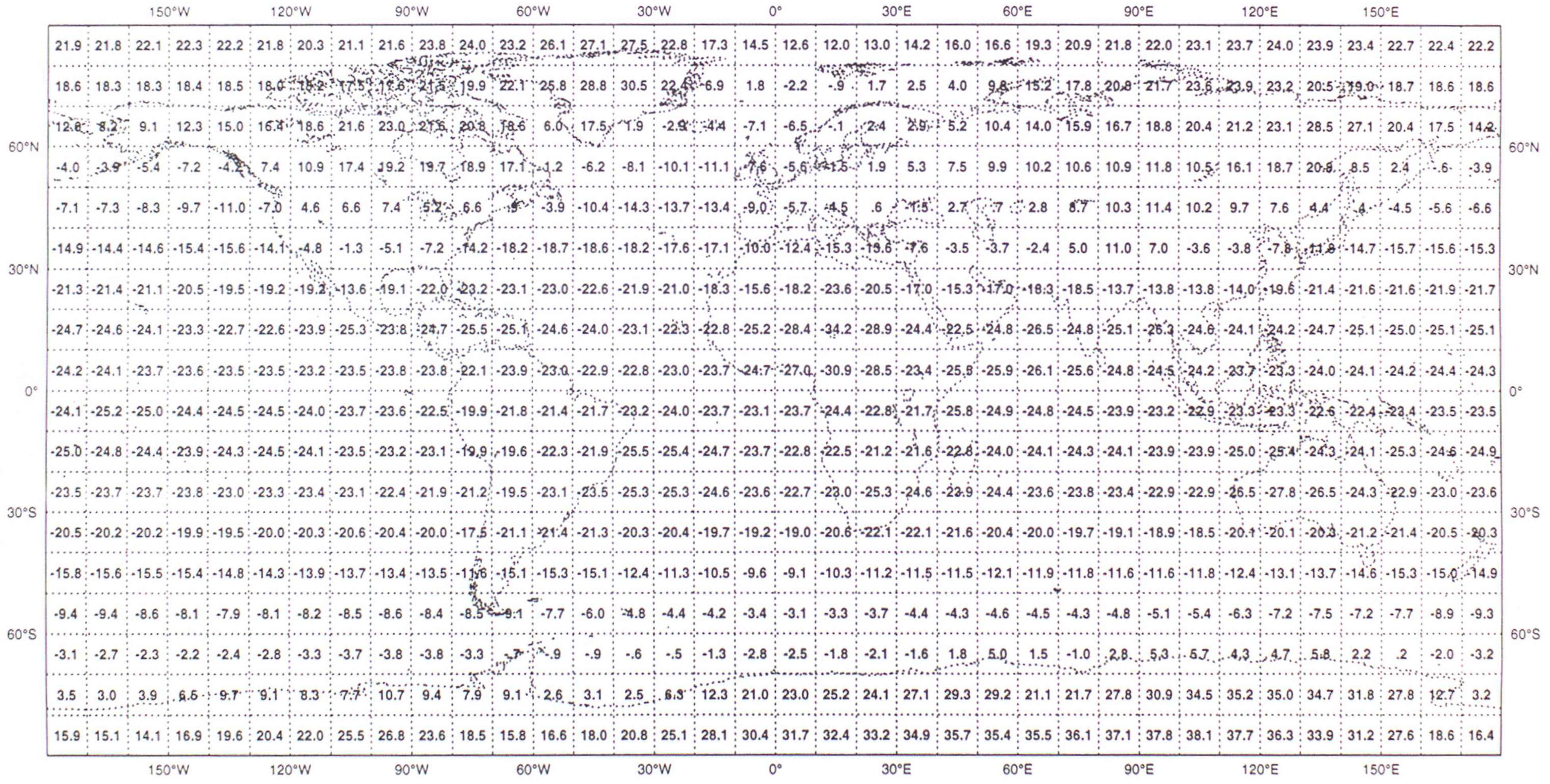
Period	:One calendar month.
Data monitored	:Reports from NOAA-15, NOAA-16 and NOAA-17.
Standard of comparison	:Background field from UKMO global model.
Selection Criteria	:All soundings.
Data Extracted	:Sounding channels (and approximate weighting function peaks, hPa) HIRS8 (Surface) HIRS15 (700) HIRS11 (500-700) HIRS4 (400) AMSUA5 (700) AMSUA7 (300) AMSUA9 (100)
	:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. FEBRUARY 2003
NOAA15, using all observations
Global average number of observations in 24 hours = 575274



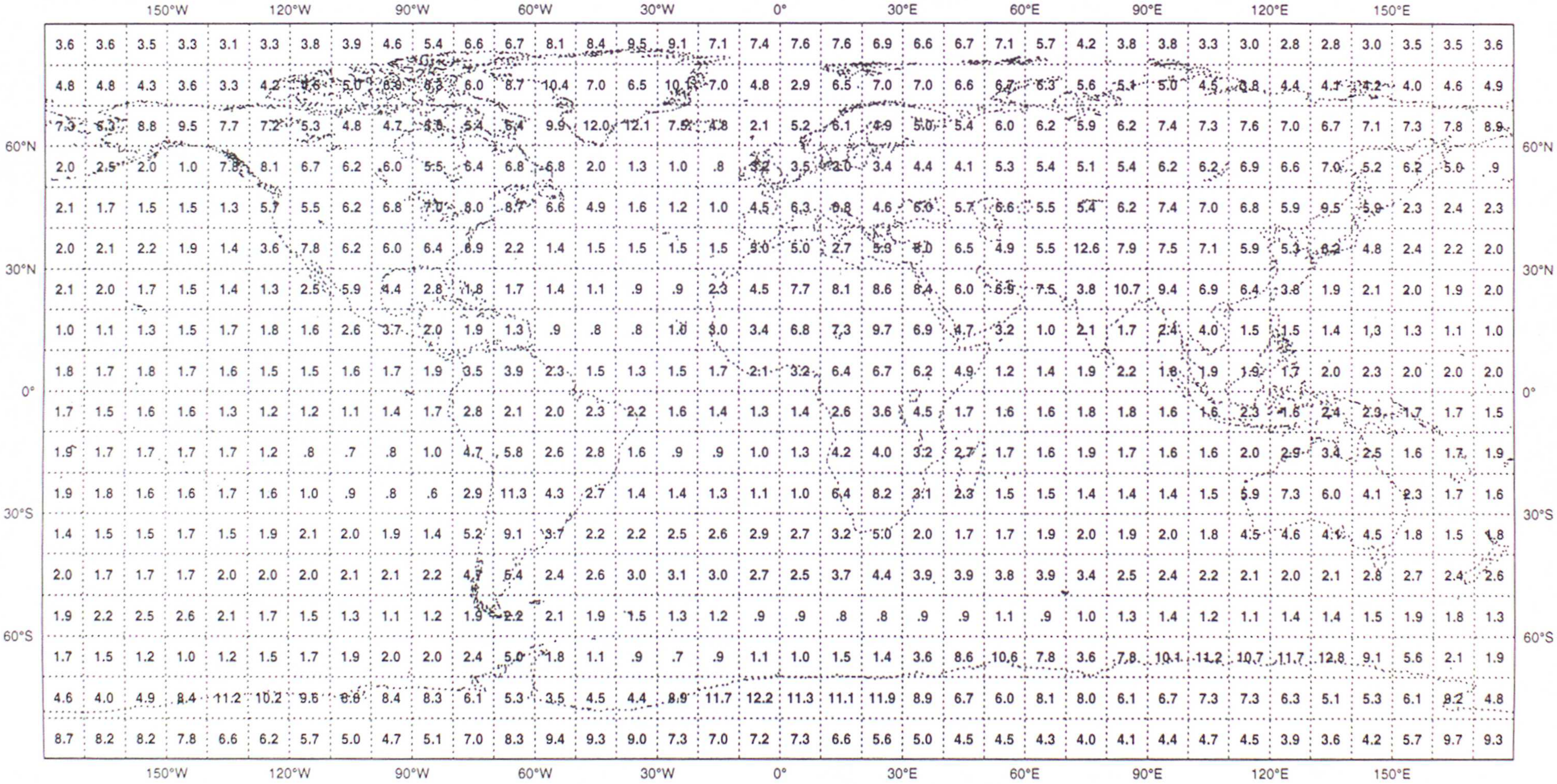
453	462	472	476	482	483	483	484	442	331	269	349	381	388	336	377	427	464	456	442	435	426	413	395	392	408	407	383	408	407	411	415	419	425	436	446
1185	1247	1279	1308	1314	1298	1258	1322	1157	730	978	1089	1048	875	907	1197	1305	1280	1245	1177	1145	1129	1108	1074	1108	1141	1133	983	904	1103	1129	1125	1118	1119	1141	1154
847	957	1008	1025	1022	989	985	1028	986	985	953	944	1074	929	1039	1138	1100	1041	1005	936	897	900	929	994	1039	1120	1141	1028	1056	1052	955	647	705	738	618	645
807	856	951	1043	1050	1038	1098	1076	1092	1068	1033	1048	1094	1104	1095	1037	969	926	885	855	858	877	946	1001	1075	1088	1094	1085	1111	1013	972	896	913	851	821	810
809	803	855	994	1011	1040	1082	1094	1079	1027	1052	1076	1051	1066	1073	990	940	900	857	850	810	906	1014	1029	1025	1001	961	764	833	1010	1076	1033	905	807	793	751
879	942	927	1028	1023	1056	1100	1050	1091	1022	1032	1085	1013	1092	1037	925	954	867	825	857	775	949	1044	1036	1051	1020	1075	1040	1033	1132	1054	1059	919	759	821	757
826	1002	997	1051	1037	1077	1097	1009	1082	1027	1018	1036	961	1089	1046	913	949	802	808	842	730	961	1064	1038	1036	1007	1137	1052	1047	1150	1019	1089	980	754	855	760
691	878	947	998	969	1025	1066	1002	1047	1035	976	1001	967	1020	946	879	947	790	805	797	771	1002	1052	1022	1013	994	1135	1018	1012	1124	1000	1052	922	654	723	689
467	716	862	972	979	1023	1063	1032	1009	1054	974	908	932	780	845	889	862	762	761	672	651	931	1032	1022	993	944	951	857	775	820	585	557	533	605	608	474
278	440	748	933	1000	1021	1062	1074	999	1041	532	443	652	879	876	904	870	773	673	481	640	829	891	853	756	697	653	503	335	176	245	308	575	583	456	373
469	348	558	750	852	936	1019	1086	995	1059	740	708	765	929	978	972	829	823	762	487	450	590	716	714	677	799	801	809	716	478	435	337	557	714	546	563
700	607	744	871	975	928	991	1098	1013	1068	1019	936	926	934	981	1002	804	844	770	721	907	847	922	1007	935	948	866	965	957	846	891	736	791	868	739	799
783	727	878	976	1051	1035	995	1086	1057	1081	1062	1044	1042	895	919	954	818	845	780	817	1025	1011	1074	1062	1025	1032	989	1082	1091	998	1073	972	955	1003	841	828
803	799	861	988	1040	1035	1015	1066	1098	1090	1086	1094	1084	1012	961	905	850	827	805	902	1033	1062	1093	1090	1098	1091	1058	1103	1100	1062	1078	1056	1055	1032	911	838
854	845	900	1001	1077	1064	1034	1072	1112	1120	1124	1125	1110	1040	962	896	853	856	890	983	1062	1076	1095	1130	1153	1139	1098	1104	1111	1094	1090	1090	1104	1084	991	904
982	946	950	995	1051	1089	1109	1137	1158	1181	1187	1145	1130	1054	986	937	933	966	1034	1087	1136	1149	1164	1194	1217	1214	1183	1142	1137	1134	1145	1161	1175	1161	1117	1053
1201	1152	1087	1042	1015	957	1031	1135	1141	1065	1031	1040	1145	1147	1130	1093	1054	995	824	823	866	834	674	828	1193	1201	1026	704	908	931	887	1099	1117	1147	1209	1216
399	362	362	370	374	392	395	341	312	403	412	404	402	409	416	419	404	386	359	376	395	360	291	262	222	210	255	314	359	383	416	417	429	443	433	391

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



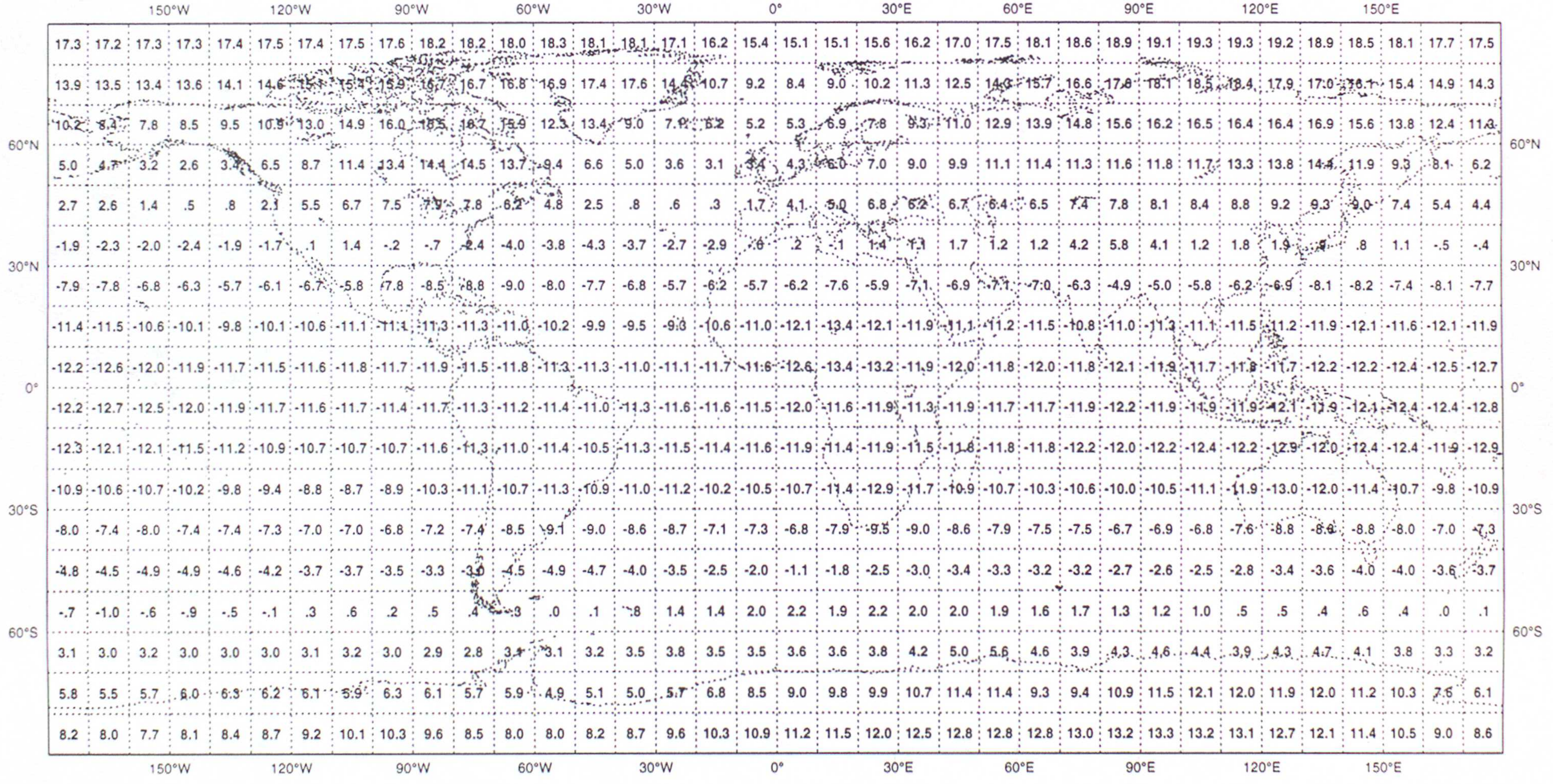
21.9	21.8	22.1	22.3	22.2	21.8	20.3	21.1	21.6	23.8	24.0	23.2	26.1	27.1	27.5	22.8	17.3	14.5	12.6	12.0	13.0	14.2	16.0	16.6	19.3	20.9	21.8	22.0	23.1	23.7	24.0	23.9	23.4	22.7	22.4	22.2
18.6	18.3	18.3	18.4	18.5	18.0	18.2	17.5	19.6	21.5	19.9	22.1	25.8	28.8	30.5	22.4	-6.9	1.8	-2.2	-.9	1.7	2.5	4.0	9.8	15.2	17.8	20.8	21.7	23.6	23.9	23.2	20.5	19.0	18.7	18.6	18.6
12.6	8.2	9.1	12.3	15.0	16.4	18.6	21.6	23.0	21.6	20.8	18.6	6.0	17.5	1.9	-2.9	-4.4	-7.1	-6.5	-.1	2.4	2.9	5.2	10.4	14.0	15.9	16.7	18.8	20.4	21.2	23.1	28.5	27.1	20.4	17.5	14.2
-4.0	-3.9	-5.4	-7.2	-4.2	7.4	10.9	17.4	19.2	19.7	18.9	17.1	-1.2	-6.2	-8.1	-10.1	-11.1	-7.6	-5.6	-1.5	1.9	5.3	7.5	9.9	10.2	10.6	10.9	11.8	10.5	16.1	18.7	20.8	8.5	2.4	-.6	-3.9
-7.1	-7.3	-8.3	-9.7	-11.0	-7.0	4.6	6.6	7.4	5.2	6.6	.5	-3.9	-10.4	-14.3	-13.7	-13.4	-9.0	-5.7	-4.5	.6	-1.5	2.7	.7	2.8	8.7	10.3	11.4	10.2	9.7	7.6	4.4	.4	-4.5	-5.6	-6.6
-14.9	-14.4	-14.6	-15.4	-15.6	-14.1	-4.8	-1.3	-5.1	-7.2	-14.2	-18.2	-18.7	-18.6	-18.2	-17.6	-17.1	-10.0	-12.4	-15.3	-13.6	-7.6	-3.5	-3.7	-2.4	5.0	11.0	7.0	-3.6	-3.8	-7.8	-11.8	-14.7	-15.7	-15.6	-15.3
-21.3	-21.4	-21.1	-20.5	-19.5	-19.2	-19.2	-13.6	-19.1	-22.0	-23.2	-23.1	-23.0	-22.6	-21.9	-21.0	-18.3	-15.6	-18.2	-23.6	-20.5	-17.0	-15.3	-17.0	-18.3	-18.5	-13.7	-13.8	-13.8	-14.0	-19.6	-21.4	-21.6	-21.6	-21.9	-21.7
-24.7	-24.6	-24.1	-23.3	-22.7	-22.6	-23.9	-25.3	-23.8	-24.7	-25.5	-25.1	-24.6	-24.0	-23.1	-22.3	-22.8	-25.2	-28.4	-34.2	-28.9	-24.4	-22.5	-24.8	-26.5	-24.8	-25.1	-26.3	-24.6	-24.1	-24.2	-24.7	-25.1	-25.0	-25.1	-25.1
-24.2	-24.1	-23.7	-23.6	-23.5	-23.5	-23.2	-23.5	-23.8	-23.8	-22.1	-23.9	-23.0	-22.9	-22.8	-23.0	-23.7	-24.7	-27.0	-30.9	-28.5	-23.4	-25.8	-25.9	-26.1	-25.6	-24.8	-24.5	-24.2	-23.7	-23.3	-24.0	-24.1	-24.2	-24.4	-24.3
-24.1	-25.2	-25.0	-24.4	-24.5	-24.5	-24.0	-23.7	-23.6	-22.5	-19.9	-21.8	-21.4	-21.7	-23.2	-24.0	-23.7	-23.1	-23.7	-24.4	-22.8	-21.7	-25.8	-24.9	-24.8	-24.5	-23.9	-23.2	-22.9	-23.3	-23.3	-22.6	-22.4	-23.4	-23.5	-23.5
-25.0	-24.8	-24.4	-23.9	-24.3	-24.5	-24.1	-23.5	-23.2	-23.1	-19.9	-19.6	-22.3	-21.9	-25.5	-25.4	-24.7	-23.7	-22.8	-22.5	-21.2	-21.6	-22.8	-24.0	-24.1	-24.3	-24.1	-23.9	-23.9	-25.0	-25.4	-24.3	-24.1	-25.3	-24.6	-24.9
-23.5	-23.7	-23.7	-23.8	-23.0	-23.3	-23.4	-23.1	-22.4	-21.9	-21.2	-19.5	-23.1	-23.5	-25.3	-25.3	-24.6	-23.6	-22.7	-23.0	-25.3	-24.6	-23.9	-24.4	-23.6	-23.8	-23.4	-22.9	-22.9	-26.5	-27.8	-26.5	-24.3	-22.9	-23.0	-23.6
-20.5	-20.2	-20.2	-19.9	-19.5	-20.0	-20.3	-20.6	-20.4	-20.0	-17.5	-21.1	-21.4	-21.3	-20.3	-20.4	-19.7	-19.2	-19.0	-20.6	-22.1	-22.1	-21.6	-20.4	-20.0	-19.7	-19.1	-18.9	-18.5	-20.1	-20.1	-20.3	-21.2	-21.4	-20.5	-20.3
-15.8	-15.6	-15.5	-15.4	-14.8	-14.3	-13.9	-13.7	-13.4	-13.5	-11.6	-15.1	-15.3	-15.1	-12.4	-11.3	-10.5	-9.6	-9.1	-10.3	-11.2	-11.5	-11.5	-12.1	-11.9	-11.8	-11.6	-11.6	-11.8	-12.4	-13.1	-13.7	-14.6	-15.3	-15.0	-14.9
-9.4	-9.4	-8.6	-8.1	-7.9	-8.1	-8.2	-8.5	-8.6	-8.4	-8.5	-9.1	-7.7	-6.0	-4.8	-4.4	-4.2	-3.4	-3.1	-3.3	-3.7	-4.4	-4.3	-4.6	-4.5	-4.3	-4.8	-5.1	-5.4	-6.3	-7.2	-7.5	-7.2	-7.7	-8.9	-9.3
-3.1	-2.7	-2.3	-2.2	-2.4	-2.8	-3.3	-3.7	-3.8	-3.8	-3.3	-.7	-.9	-.9	-.6	-.5	-1.3	-2.8	-2.5	-1.8	-2.1	-1.6	1.8	5.0	1.5	-1.0	2.8	5.3	5.7	4.3	4.7	5.8	2.2	.2	-2.0	-3.2
3.5	3.0	3.9	6.5	9.7	9.1	8.3	7.7	10.7	9.4	7.9	9.1	2.6	3.1	2.5	6.3	12.3	21.0	23.0	25.2	24.1	27.1	29.3	29.2	21.1	21.7	27.8	30.9	34.5	35.2	35.0	34.7	31.8	27.8	12.7	3.2
15.9	15.1	14.1	16.9	19.6	20.4	22.0	25.5	26.8	23.6	18.5	15.8	16.6	18.0	20.8	25.1	28.1	30.4	31.7	32.4	33.2	34.9	35.7	35.4	35.5	36.1	37.1	37.8	38.1	37.7	36.3	33.9	31.2	27.6	18.6	16.4

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



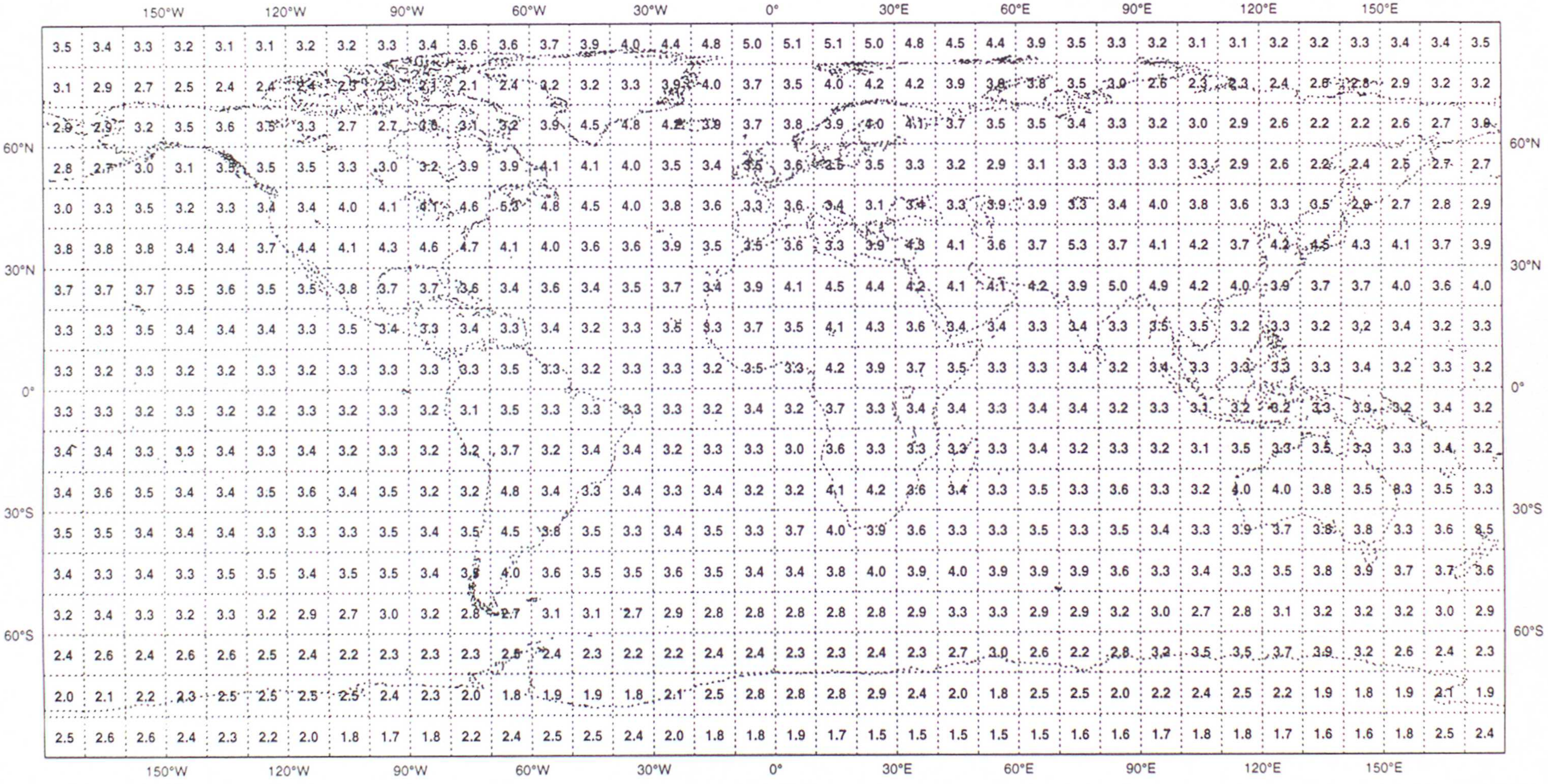
3.6	3.6	3.5	3.3	3.1	3.3	3.8	3.9	4.6	5.4	6.6	6.7	8.1	8.4	9.5	9.1	7.1	7.4	7.6	7.6	6.9	6.6	6.7	7.1	5.7	4.2	3.8	3.8	3.3	3.0	2.8	2.8	3.0	3.5	3.5	3.6
4.8	4.8	4.3	3.6	3.3	4.2	4.6	5.0	6.9	6.3	6.0	8.7	10.4	7.0	6.5	10.1	7.0	4.8	2.9	6.5	7.0	7.0	6.6	6.7	6.3	5.6	5.1	5.0	4.5	3.8	4.4	4.1	4.2	4.0	4.6	4.9
7.3	6.3	8.8	9.5	7.7	7.2	5.3	4.8	4.7	5.8	5.4	5.4	9.9	12.0	12.1	7.5	4.8	2.1	5.2	6.1	4.9	5.0	5.4	6.0	6.2	5.9	6.2	7.4	7.3	7.6	7.0	6.7	7.1	7.3	7.8	8.9
2.0	2.5	2.0	1.0	7.8	8.1	6.7	6.2	6.0	5.5	6.4	6.8	6.8	2.0	1.3	1.0	.8	3.2	3.5	2.0	3.4	4.4	4.1	5.3	5.4	5.1	5.4	6.2	6.2	6.9	6.6	7.0	5.2	6.2	5.0	.9
2.1	1.7	1.5	1.5	1.3	5.7	5.5	6.2	6.8	7.0	8.0	8.7	6.6	4.9	1.6	1.2	1.0	4.5	6.3	6.8	4.6	6.0	5.7	6.6	5.5	5.4	6.2	7.4	7.0	6.8	5.9	9.5	5.9	2.3	2.4	2.3
2.0	2.1	2.2	1.9	1.4	3.6	7.8	6.2	6.0	6.4	6.9	2.2	1.4	1.5	1.5	1.5	1.5	5.0	5.0	2.7	5.8	8.0	6.5	4.9	5.5	12.6	7.9	7.5	7.1	5.9	5.3	6.2	4.8	2.4	2.2	2.0
2.1	2.0	1.7	1.5	1.4	1.3	2.5	5.9	4.4	2.8	1.8	1.7	1.4	1.1	.9	.9	2.3	4.5	7.7	8.1	8.6	8.4	6.0	6.9	7.5	3.8	10.7	9.4	6.9	6.4	3.8	1.9	2.1	2.0	1.9	2.0
1.0	1.1	1.3	1.5	1.7	1.8	1.6	2.6	3.7	2.0	1.9	1.3	.9	.8	.8	1.0	3.0	3.4	6.8	7.3	9.7	6.9	4.7	3.2	1.0	2.1	1.7	2.4	4.0	1.5	1.5	1.4	1.3	1.3	1.1	1.0
1.8	1.7	1.8	1.7	1.6	1.5	1.5	1.6	1.7	1.9	3.5	3.9	2.3	1.5	1.3	1.5	1.7	2.1	3.2	6.4	6.7	6.2	4.9	1.2	1.4	1.9	2.2	1.8	1.9	1.9	1.7	2.0	2.3	2.0	2.0	2.0
1.7	1.5	1.6	1.6	1.3	1.2	1.2	1.1	1.4	1.7	2.8	2.1	2.0	2.3	2.2	1.6	1.4	1.3	1.4	2.6	3.6	4.5	1.7	1.6	1.6	1.8	1.8	1.6	1.6	2.3	1.6	2.4	2.3	1.7	1.7	1.5
1.9	1.7	1.7	1.7	1.7	1.2	.8	.7	.8	1.0	4.7	5.8	2.6	2.8	1.6	.9	.9	1.0	1.3	4.2	4.0	3.2	2.7	1.7	1.6	1.9	1.7	1.6	1.6	2.0	2.9	3.4	2.5	1.6	1.7	1.9
1.9	1.8	1.6	1.6	1.7	1.6	1.0	.9	.8	.6	2.9	11.3	4.3	2.7	1.4	1.4	1.3	1.1	1.0	6.4	8.2	3.1	2.3	1.5	1.5	1.4	1.4	1.4	1.5	5.9	7.3	6.0	4.1	2.3	1.7	1.6
1.4	1.5	1.5	1.7	1.5	1.9	2.1	2.0	1.9	1.4	5.2	9.1	3.7	2.2	2.2	2.5	2.6	2.9	2.7	3.2	5.0	2.0	1.7	1.7	1.9	2.0	1.9	2.0	1.8	4.5	4.6	4.1	4.5	1.8	1.5	1.8
2.0	1.7	1.7	1.7	2.0	2.0	2.0	2.1	2.1	2.2	4.7	5.4	2.4	2.6	3.0	3.1	3.0	2.7	2.5	3.7	4.4	3.9	3.9	3.8	3.9	3.4	2.5	2.4	2.2	2.1	2.0	2.1	2.8	2.7	2.4	2.6
1.9	2.2	2.5	2.6	2.1	1.7	1.5	1.3	1.1	1.2	1.9	2.2	2.1	1.9	1.5	1.3	1.2	.9	.9	.8	.8	.9	.9	1.1	.9	1.0	1.3	1.4	1.2	1.1	1.4	1.4	1.5	1.9	1.8	1.3
1.7	1.5	1.2	1.0	1.2	1.5	1.7	1.9	2.0	2.0	2.4	5.0	1.8	1.1	.9	.7	.9	1.1	1.0	1.5	1.4	3.6	8.6	10.6	7.8	3.6	7.8	10.1	11.2	10.7	11.7	12.8	9.1	5.6	2.1	1.9
4.6	4.0	4.9	8.4	11.2	10.2	9.6	8.8	8.4	8.3	6.1	5.3	3.5	4.5	4.4	8.9	11.7	12.2	11.3	11.1	11.9	8.9	6.7	6.0	8.1	8.0	6.1	6.7	7.3	7.3	6.3	5.1	5.3	6.1	8.2	4.8
8.7	8.2	8.2	7.8	6.6	6.2	5.7	5.0	4.7	5.1	7.0	8.3	9.4	9.3	9.0	7.3	7.0	7.2	7.3	6.6	5.6	5.0	4.5	4.5	4.3	4.0	4.1	4.4	4.7	4.5	3.9	3.6	4.2	5.7	9.7	9.3

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



17.3	17.2	17.3	17.3	17.4	17.5	17.4	17.5	17.6	18.2	18.2	18.0	18.3	18.1	18.1	17.1	16.2	15.4	15.1	15.1	15.6	16.2	17.0	17.5	18.1	18.6	18.9	19.1	19.3	19.3	19.2	18.9	18.5	18.1	17.7	17.5
13.9	13.5	13.4	13.6	14.1	14.6	15.1	15.4	15.9	16.7	16.7	16.8	16.9	17.4	17.6	14.4	10.7	9.2	8.4	9.0	10.2	11.3	12.5	14.0	15.7	16.6	17.8	18.1	18.5	18.4	17.9	17.0	16.1	15.4	14.9	14.3
10.2	8.4	7.8	8.5	9.5	10.9	13.0	14.9	16.0	18.5	18.7	15.9	12.3	13.4	9.0	7.9	6.2	5.2	5.3	6.9	7.8	9.3	11.0	12.9	13.9	14.8	15.6	16.2	16.5	16.4	16.4	16.9	15.6	13.8	12.4	11.3
5.0	4.7	3.2	2.6	3.4	6.5	8.7	11.4	13.4	14.4	14.5	13.7	9.4	6.6	5.0	3.6	3.1	3.4	4.3	6.0	7.0	9.0	9.9	11.1	11.4	11.3	11.6	11.8	11.7	13.3	13.8	14.4	11.9	9.3	8.1	6.2
2.7	2.6	1.4	.5	.8	2.1	5.5	6.7	7.5	7.9	7.8	6.2	4.8	2.5	.8	.6	.3	1.7	4.1	5.0	6.8	6.2	6.7	6.4	6.5	7.4	7.8	8.1	8.4	8.8	9.2	9.3	9.0	7.4	5.4	4.4
-1.9	-2.3	-2.0	-2.4	-1.9	-1.7	.1	1.4	-.2	-.7	-2.4	-4.0	-3.8	-4.3	-3.7	-2.7	-2.9	-.6	.2	-.1	1.4	1.1	1.7	1.2	1.2	4.2	5.8	4.1	1.2	1.8	1.9	.9	.8	1.1	-.5	-.4
-7.9	-7.8	-6.8	-6.3	-5.7	-6.1	-6.7	-5.8	-7.8	-8.5	-8.8	-9.0	-8.0	-7.7	-6.8	-5.7	-6.2	-5.7	-6.2	-7.6	-5.9	-7.1	-6.9	-7.1	-7.0	-6.3	-4.9	-5.0	-5.8	-6.2	-6.9	-8.1	-8.2	-7.4	-8.1	-7.7
-11.4	-11.5	-10.6	-10.1	-9.8	-10.1	-10.6	-11.1	-11.1	-11.3	-11.3	-11.0	-10.2	-9.9	-9.5	-9.3	-10.6	-11.0	-12.1	-13.4	-12.1	-11.9	-11.1	-11.2	-11.5	-10.8	-11.0	-11.3	-11.1	-11.5	-11.2	-11.9	-12.1	-11.6	-12.1	-11.9
-12.2	-12.6	-12.0	-11.9	-11.7	-11.5	-11.6	-11.8	-11.7	-11.9	-11.5	-11.8	-11.3	-11.3	-11.0	-11.1	-11.7	-11.6	-12.6	-13.4	-13.2	-11.9	-12.0	-11.8	-12.0	-11.8	-12.1	-11.9	-11.7	-11.8	-11.7	-12.2	-12.2	-12.4	-12.5	-12.7
-12.2	-12.7	-12.5	-12.0	-11.9	-11.7	-11.6	-11.7	-11.4	-11.7	-11.3	-11.2	-11.4	-11.0	-11.3	-11.6	-11.6	-11.5	-12.0	-11.6	-11.9	-11.3	-11.9	-11.7	-11.7	-11.9	-12.2	-11.9	-11.9	-11.9	-12.1	-11.9	-12.1	-12.4	-12.4	-12.8
-12.3	-12.1	-12.1	-11.5	-11.2	-10.9	-10.7	-10.7	-10.7	-11.6	-11.3	-11.0	-11.4	-10.5	-11.3	-11.5	-11.4	-11.6	-11.9	-11.4	-11.9	-11.5	-11.8	-11.8	-11.8	-12.2	-12.0	-12.2	-12.4	-12.2	-12.9	-12.0	-12.4	-12.4	-11.9	-12.9
-10.9	-10.6	-10.7	-10.2	-9.8	-9.4	-8.8	-8.7	-8.9	-10.3	-11.1	-10.7	-11.3	-10.9	-11.0	-11.2	-10.2	-10.5	-10.7	-11.4	-12.9	-11.7	-10.9	-10.7	-10.3	-10.6	-10.0	-10.5	-11.1	-11.9	-13.0	-12.0	-11.4	-10.7	-9.8	-10.9
-8.0	-7.4	-8.0	-7.4	-7.4	-7.3	-7.0	-7.0	-6.8	-7.2	-7.4	-8.5	-9.1	-9.0	-8.6	-8.7	-7.1	-7.3	-6.8	-7.9	-9.5	-9.0	-8.6	-7.9	-7.5	-7.5	-6.7	-6.9	-6.8	-7.6	-8.8	-8.6	-8.8	-8.0	-7.0	-7.3
-4.8	-4.5	-4.9	-4.9	-4.6	-4.2	-3.7	-3.7	-3.5	-3.3	-3.0	-4.5	-4.9	-4.7	-4.0	-3.5	-2.5	-2.0	-1.1	-1.8	-2.5	-3.0	-3.4	-3.3	-3.2	-3.2	-2.7	-2.6	-2.5	-2.8	-3.4	-3.6	-4.0	-4.0	-3.6	-3.7
-.7	-1.0	-.6	-.9	-.5	-.1	.3	.6	.2	.5	.4	.3	.0	.1	.8	1.4	1.4	2.0	2.2	1.9	2.2	2.0	2.0	1.9	1.6	1.7	1.3	1.2	1.0	.5	.5	.4	.6	.4	.0	.1
3.1	3.0	3.2	3.0	3.0	3.0	3.1	3.2	3.0	2.9	2.8	3.4	3.1	3.2	3.5	3.8	3.5	3.5	3.6	3.6	3.8	4.2	5.0	5.6	4.6	3.9	4.3	4.6	4.4	3.9	4.3	4.7	4.1	3.8	3.3	3.2
5.8	5.5	5.7	6.0	6.3	6.2	6.1	5.9	6.3	6.1	5.7	5.9	4.9	5.1	5.0	5.7	6.8	8.5	9.0	9.8	9.9	10.7	11.4	11.4	9.3	9.4	10.9	11.5	12.1	12.0	11.9	12.0	11.2	10.3	7.6	6.1
8.2	8.0	7.7	8.1	8.4	8.7	9.2	10.1	10.3	9.6	8.5	8.0	8.0	8.2	8.7	9.6	10.3	10.9	11.2	11.5	12.0	12.5	12.8	12.8	12.8	13.0	13.2	13.3	13.2	13.1	12.7	12.1	11.4	10.5	9.0	8.6

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



3.5	3.4	3.3	3.2	3.1	3.1	3.2	3.2	3.3	3.4	3.6	3.6	3.7	3.9	4.0	4.4	4.8	5.0	5.1	5.1	5.0	4.8	4.5	4.4	3.9	3.5	3.3	3.2	3.1	3.1	3.2	3.2	3.3	3.4	3.4	3.5
3.1	2.9	2.7	2.5	2.4	2.4	2.4	2.5	2.3	2.1	2.1	2.4	3.2	3.2	3.3	3.9	4.0	3.7	3.5	4.0	4.2	4.2	3.9	3.8	3.8	3.5	3.0	2.6	2.3	2.3	2.4	2.6	2.8	2.9	3.2	3.2
2.9	2.9	3.2	3.5	3.6	3.5	3.3	2.7	2.7	3.0	3.1	3.2	3.9	4.5	4.8	4.2	3.9	3.7	3.8	3.9	4.0	4.1	3.7	3.5	3.5	3.4	3.3	3.2	3.0	2.9	2.6	2.2	2.2	2.6	2.7	3.8
2.8	2.7	3.0	3.1	3.5	3.5	3.5	3.3	3.0	3.2	3.9	3.9	4.1	4.1	4.0	3.5	3.4	3.5	3.6	2.5	3.5	3.3	3.2	2.9	3.1	3.3	3.3	3.3	3.3	2.9	2.6	2.2	2.4	2.5	2.7	2.7
3.0	3.3	3.5	3.2	3.3	3.4	3.4	4.0	4.1	4.1	4.6	5.3	4.8	4.5	4.0	3.8	3.6	3.3	3.6	3.4	3.1	3.4	3.3	3.9	3.9	3.3	3.4	4.0	3.8	3.6	3.3	3.5	2.9	2.7	2.8	2.9
3.8	3.8	3.8	3.4	3.4	3.7	4.4	4.1	4.3	4.6	4.7	4.1	4.0	3.6	3.6	3.9	3.5	3.5	3.6	3.3	3.9	4.3	4.1	3.6	3.7	5.3	3.7	4.1	4.2	3.7	4.2	4.5	4.3	4.1	3.7	3.9
3.7	3.7	3.7	3.5	3.6	3.5	3.5	3.8	3.7	3.7	3.6	3.4	3.6	3.4	3.5	3.7	3.4	3.9	4.1	4.5	4.4	4.2	4.1	4.1	4.2	3.9	5.0	4.9	4.2	4.0	3.9	3.7	3.7	4.0	3.6	4.0
3.3	3.3	3.5	3.4	3.4	3.4	3.3	3.5	3.4	3.3	3.4	3.3	3.4	3.2	3.3	3.5	3.3	3.7	3.5	4.1	4.3	3.6	3.4	3.4	3.3	3.4	3.3	3.5	3.5	3.2	3.3	3.2	3.2	3.4	3.2	3.3
3.3	3.2	3.3	3.2	3.2	3.3	3.2	3.3	3.3	3.3	3.3	3.5	3.3	3.2	3.3	3.3	3.2	3.5	3.3	4.2	3.9	3.7	3.5	3.3	3.3	3.4	3.2	3.4	3.3	3.3	3.3	3.3	3.4	3.2	3.3	3.2
3.3	3.3	3.2	3.3	3.2	3.2	3.3	3.2	3.3	3.2	3.1	3.5	3.3	3.3	3.3	3.3	3.2	3.4	3.2	3.7	3.3	3.4	3.4	3.3	3.4	3.4	3.2	3.3	3.1	3.2	3.2	3.3	3.3	3.2	3.4	3.2
3.4	3.4	3.3	3.3	3.4	3.3	3.4	3.2	3.3	3.2	3.2	3.7	3.2	3.4	3.4	3.2	3.3	3.3	3.0	3.6	3.3	3.3	3.3	3.3	3.4	3.2	3.3	3.2	3.1	3.5	3.3	3.5	3.3	3.3	3.4	3.2
3.4	3.6	3.5	3.4	3.4	3.5	3.6	3.4	3.5	3.2	3.2	4.8	3.4	3.3	3.4	3.3	3.4	3.2	3.2	4.1	4.2	3.6	3.4	3.3	3.5	3.3	3.6	3.3	3.2	4.0	4.0	3.8	3.5	3.3	3.5	3.3
3.5	3.5	3.4	3.4	3.4	3.3	3.3	3.3	3.5	3.4	3.5	4.5	3.8	3.5	3.3	3.4	3.5	3.3	3.7	4.0	3.9	3.6	3.3	3.3	3.5	3.3	3.5	3.4	3.3	3.9	3.7	3.8	3.8	3.3	3.6	3.5
3.4	3.3	3.4	3.3	3.5	3.5	3.4	3.5	3.5	3.4	3.8	4.0	3.6	3.5	3.5	3.6	3.5	3.4	3.4	3.8	4.0	3.9	4.0	3.9	3.9	3.9	3.6	3.3	3.4	3.3	3.5	3.8	3.9	3.7	3.7	3.6
3.2	3.4	3.3	3.2	3.3	3.2	2.9	2.7	3.0	3.2	2.8	2.7	3.1	3.1	2.7	2.9	2.8	2.8	2.8	2.8	2.8	2.9	3.3	3.3	2.9	2.9	3.2	3.0	2.7	2.8	3.1	3.2	3.2	3.2	3.0	2.9
2.4	2.6	2.4	2.6	2.6	2.5	2.4	2.2	2.3	2.3	2.3	2.5	2.4	2.3	2.2	2.2	2.4	2.4	2.3	2.3	2.4	2.3	2.7	3.0	2.6	2.2	2.8	3.2	3.5	3.5	3.7	3.9	3.2	2.6	2.4	2.3
2.0	2.1	2.2	2.3	2.5	2.5	2.5	2.5	2.4	2.3	2.0	1.8	1.9	1.9	1.8	2.1	2.5	2.8	2.8	2.8	2.9	2.4	2.0	1.8	2.5	2.5	2.0	2.2	2.4	2.5	2.2	1.9	1.8	1.9	2.1	1.9
2.5	2.6	2.6	2.4	2.3	2.2	2.0	1.8	1.7	1.8	2.2	2.4	2.5	2.5	2.4	2.0	1.8	1.8	1.9	1.7	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.7	1.8	1.8	1.7	1.6	1.6	1.8	2.5	2.4

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations

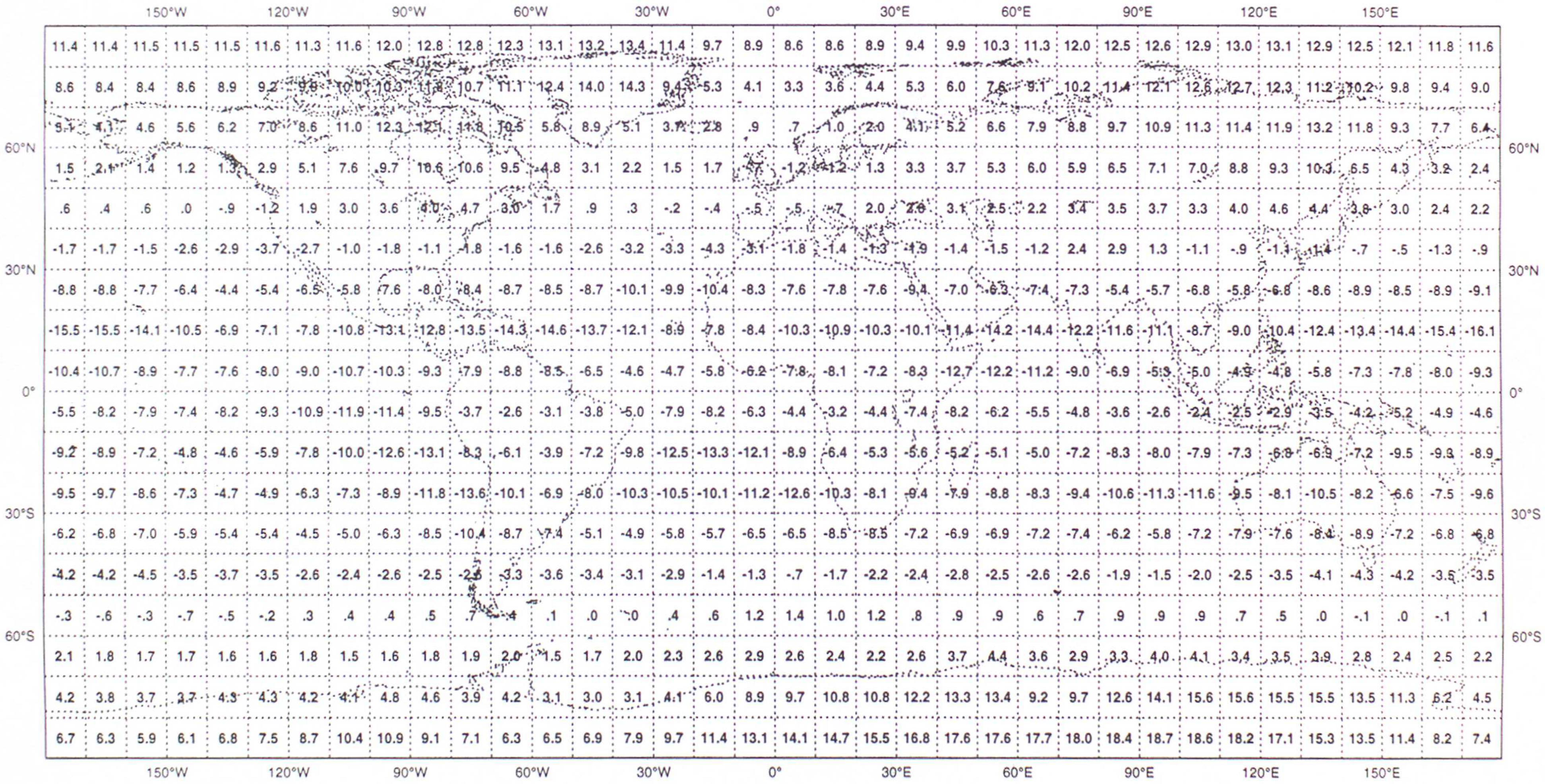

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
11.4 11.4 11.5 11.5 11.5 11.6 11.3 11.6 12.0 12.8 12.8 12.3 13.1 13.2 13.4 11.4 9.7 8.9 8.6 8.6 8.9 9.4 9.9 10.3 11.3 12.0 12.5 12.6 12.9 13.0 13.1 12.9 12.5 12.1 11.8 11.6
8.6 8.4 8.4 8.6 8.9 9.2 9.8 10.0 10.3 11.8 10.7 11.1 12.4 14.0 14.3 9.4 -5.3 4.1 3.3 3.6 4.4 5.3 6.0 7.6 9.1 10.2 11.4 12.1 12.6 12.7 12.3 11.2 10.2 9.8 9.4 9.0
5.1 4.1 4.6 5.6 6.2 7.0 8.6 11.0 12.3 12.1 11.8 10.5 5.8 8.9 5.1 3.7 2.8 .9 .7 1.0 2.0 4.1 5.2 6.6 7.9 8.8 9.7 10.9 11.3 11.4 11.9 13.2 11.8 9.3 7.7 6.4
60°N
1.5 2.1 1.4 1.2 1.3 2.9 5.1 7.6 9.7 10.6 10.6 9.5 4.8 3.1 2.2 1.5 1.7 .7 -1.2 -1.2 1.3 3.3 3.7 5.3 6.0 5.9 6.5 7.1 7.0 8.8 9.3 10.3 6.5 4.3 3.2 2.4
.6 .4 .6 .0 -.9 -1.2 1.9 3.0 3.6 4.0 4.7 3.0 1.7 .9 .3 -.2 -.4 -.5 -.5 -.7 2.0 2.8 3.1 2.5 2.2 3.4 3.5 3.7 3.3 4.0 4.6 4.4 3.8 3.0 2.4 2.2
-1.7 -1.7 -1.5 -2.6 -2.9 -3.7 -2.7 -1.0 -1.8 -1.1 -1.8 -1.6 -1.6 -2.6 -3.2 -3.3 -4.3 -3.1 -1.8 -1.4 -1.3 -1.9 -1.4 -1.5 -1.2 2.4 2.9 1.3 -1.1 -.9 -1.1 -1.4 -.7 -.5 -1.3 -.9
30°N
-8.8 -8.8 -7.7 -6.4 -4.4 -5.4 -6.5 -5.8 -7.6 -8.0 -8.4 -8.7 -8.5 -8.7 -10.1 -9.9 -10.4 -8.3 -7.6 -7.8 -7.6 -9.4 -7.0 -6.3 -7.4 -7.3 -5.4 -5.7 -6.8 -5.8 -6.8 -8.6 -8.9 -8.5 -8.9 -9.1
-15.5 -15.5 -14.1 -10.5 -6.9 -7.1 -7.8 -10.8 -13.1 -12.8 -13.5 -14.3 -14.6 -13.7 -12.1 -8.9 -7.8 -8.4 -10.3 -10.9 -10.3 -10.1 -11.4 -14.2 -14.4 -12.2 -11.6 -11.1 -8.7 -9.0 -10.4 -12.4 -13.4 -14.4 -15.4 -16.1
-10.4 -10.7 -8.9 -7.7 -7.6 -8.0 -9.0 -10.7 -10.3 -9.3 -7.9 -8.8 -8.5 -6.5 -4.6 -4.7 -5.8 -6.2 -7.8 -8.1 -7.2 -8.3 -12.7 -12.2 -11.2 -9.0 -6.9 -5.3 -5.0 -4.9 -4.8 -5.8 -7.3 -7.8 -8.0 -9.3
0°
-5.5 -8.2 -7.9 -7.4 -8.2 -9.3 -10.9 -11.9 -11.4 -9.5 -3.7 -2.6 -3.1 -3.8 -5.0 -7.9 -8.2 -6.3 -4.4 -3.2 -4.4 -7.4 -8.2 -6.2 -5.5 -4.8 -3.6 -2.6 -2.4 -2.5 -2.9 -3.5 -4.2 -5.2 -4.9 -4.6
-9.2 -8.9 -7.2 -4.8 -4.6 -5.9 -7.8 -10.0 -12.6 -13.1 -8.3 -6.1 -3.9 -7.2 -9.8 -12.5 -13.3 -12.1 -8.9 -6.4 -5.3 -5.6 -5.2 -5.1 -5.0 -7.2 -8.3 -8.0 -7.9 -7.3 -6.8 -6.9 -7.2 -9.5 -9.3 -8.9
-9.5 -9.7 -8.6 -7.3 -4.7 -4.9 -6.3 -7.3 -8.9 -11.8 -13.6 -10.1 -6.9 -8.0 -10.3 -10.5 -10.1 -11.2 -12.6 -10.3 -8.1 -9.4 -7.9 -8.8 -8.3 -9.4 -10.6 -11.3 -11.6 -9.5 -8.1 -10.5 -8.2 -6.6 -7.5 -9.6
30°S
-6.2 -6.8 -7.0 -5.9 -5.4 -5.4 -4.5 -5.0 -6.3 -8.5 -10.4 -8.7 -7.4 -5.1 -4.9 -5.8 -5.7 -6.5 -6.5 -8.5 -8.5 -7.2 -6.9 -6.9 -7.2 -7.4 -6.2 -5.8 -7.2 -7.9 -7.6 -8.4 -8.9 -7.2 -6.8 -6.8
-4.2 -4.2 -4.5 -3.5 -3.7 -3.5 -2.6 -2.4 -2.6 -2.5 -2.5 -3.3 -3.6 -3.4 -3.1 -2.9 -1.4 -1.3 -.7 -1.7 -2.2 -2.4 -2.8 -2.5 -2.6 -2.6 -1.9 -1.5 -2.0 -2.5 -3.5 -4.1 -4.3 -4.2 -3.5 -3.5
-.3 -.6 -.3 -.7 -.5 -.2 .3 .4 .4 .5 .7 .4 .1 .0 .0 .4 .6 1.2 1.4 1.0 1.2 .8 .9 .9 .6 .7 .9 .9 .9 .7 .5 .0 -.1 .0 -.1 .1
60°S
2.1 1.8 1.7 1.7 1.6 1.6 1.8 1.5 1.6 1.8 1.9 2.0 1.5 1.7 2.0 2.3 2.6 2.9 2.6 2.4 2.2 2.6 3.7 4.4 3.6 2.9 3.3 4.0 4.1 3.4 3.5 3.9 2.8 2.4 2.5 2.2
4.2 3.8 3.7 3.7 4.3 4.3 4.2 4.1 4.8 4.6 3.9 4.2 3.1 3.0 3.1 4.1 6.0 8.9 9.7 10.8 10.8 12.2 13.3 13.4 9.2 9.7 12.6 14.1 15.6 15.6 15.5 15.5 13.5 11.3 6.2 4.5
6.7 6.3 5.9 6.1 6.8 7.5 8.7 10.4 10.9 9.1 7.1 6.3 6.5 6.9 7.9 9.7 11.4 13.1 14.1 14.7 15.5 16.8 17.6 17.6 17.7 18.0 18.4 18.7 18.6 18.2 17.1 15.3 13.5 11.4 8.2 7.4
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations

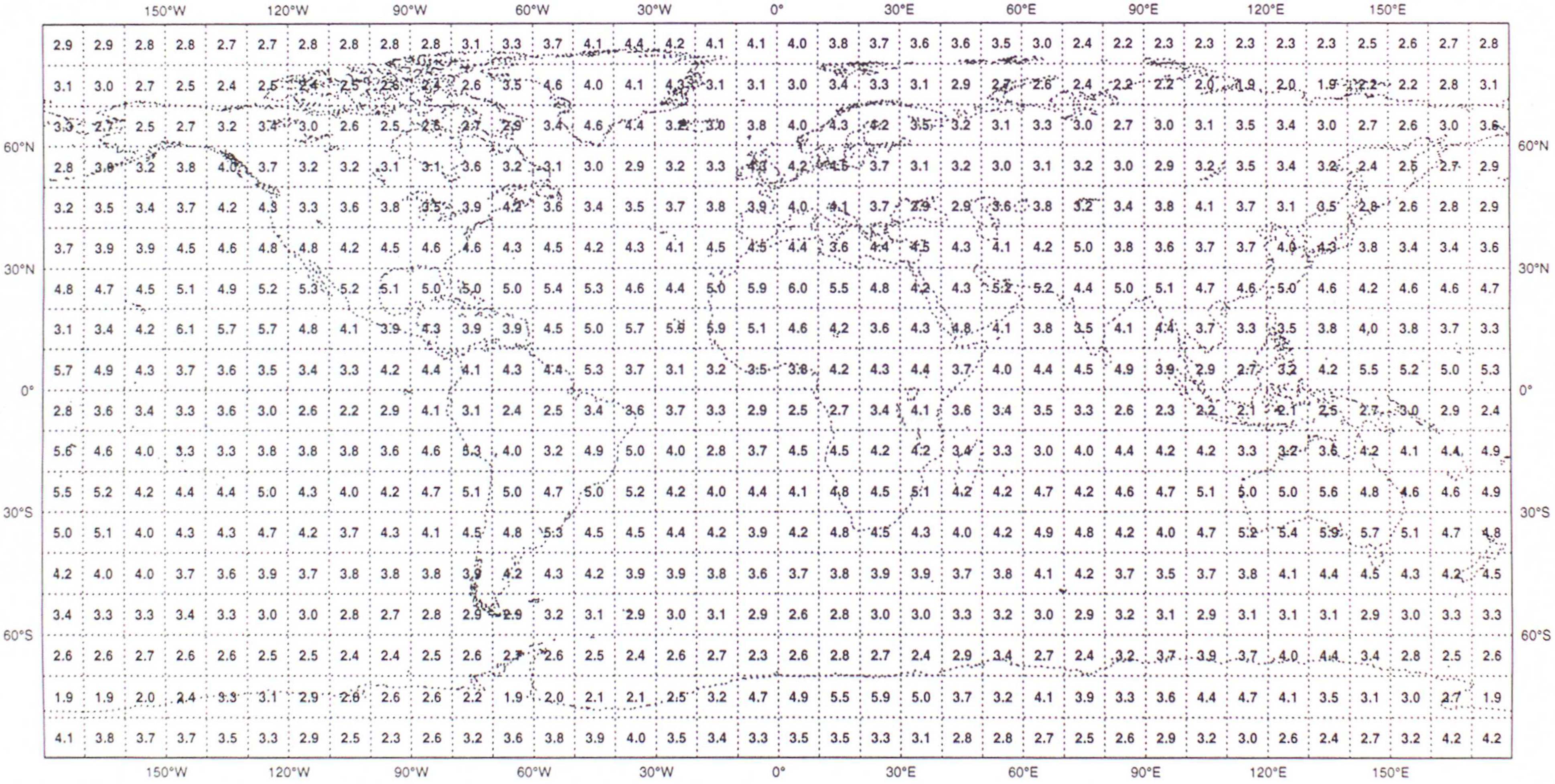

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2.9 2.9 2.8 2.8 2.7 2.7 2.8 2.8 2.8 2.8 3.1 3.3 3.7 4.1 4.4 4.2 4.1 4.1 4.0 3.8 3.7 3.6 3.6 3.5 3.0 2.4 2.2 2.3 2.3 2.3 2.3 2.3 2.5 2.6 2.7 2.8
3.1 3.0 2.7 2.5 2.4 2.5 2.4 2.5 2.6 2.4 2.6 3.5 4.6 4.0 4.1 4.3 3.1 3.1 3.0 3.4 3.3 3.1 2.9 2.7 2.6 2.4 2.2 2.2 2.0 1.9 2.0 1.9 2.2 2.2 2.8 3.1
3.3 2.7 2.5 2.7 3.2 3.4 3.0 2.6 2.5 2.8 2.7 2.9 3.4 4.6 4.4 3.2 3.0 3.8 4.0 4.3 4.2 3.5 3.2 3.1 3.3 3.0 2.7 3.0 3.1 3.5 3.4 3.0 2.7 2.6 3.0 3.6
2.8 3.8 3.2 3.8 4.0 3.7 3.2 3.2 3.1 3.1 3.6 3.2 3.1 3.0 2.9 3.2 3.3 4.3 4.2 4.5 3.7 3.1 3.2 3.0 3.1 3.2 3.0 2.9 3.2 3.5 3.4 3.2 2.4 2.5 2.7 2.9
3.2 3.5 3.4 3.7 4.2 4.3 3.3 3.6 3.8 3.5 3.9 4.2 3.6 3.4 3.5 3.7 3.8 3.9 4.0 4.1 3.7 2.9 2.9 3.6 3.8 3.2 3.4 3.8 4.1 3.7 3.1 3.5 2.8 2.6 2.8 2.9
3.7 3.9 3.9 4.5 4.6 4.8 4.8 4.2 4.5 4.6 4.6 4.3 4.5 4.2 4.3 4.1 4.5 4.5 4.4 3.6 4.4 4.5 4.3 4.1 4.2 5.0 3.8 3.6 3.7 3.7 4.0 4.3 3.8 3.4 3.4 3.6
4.8 4.7 4.5 5.1 4.9 5.2 5.3 5.2 5.1 5.0 5.0 5.0 5.4 5.3 4.6 4.4 5.0 5.9 6.0 5.5 4.8 4.2 4.3 5.2 5.2 4.4 5.0 5.1 4.7 4.6 5.0 4.6 4.2 4.6 4.6 4.7
3.1 3.4 4.2 6.1 5.7 5.7 4.8 4.1 3.9 4.3 3.9 3.9 4.5 5.0 5.7 5.9 5.9 5.1 4.6 4.2 3.6 4.3 4.8 4.1 3.8 3.5 4.1 4.4 3.7 3.3 3.5 3.8 4.0 3.8 3.7 3.3
5.7 4.9 4.3 3.7 3.6 3.5 3.4 3.3 4.2 4.4 4.1 4.3 4.4 5.3 3.7 3.1 3.2 3.5 3.8 4.2 4.3 4.4 3.7 4.0 4.4 4.5 4.9 3.9 2.9 2.7 3.2 4.2 5.5 5.2 5.0 5.3
2.8 3.6 3.4 3.3 3.6 3.0 2.6 2.2 2.9 4.1 3.1 2.4 2.5 3.4 3.6 3.7 3.3 2.9 2.5 2.7 3.4 4.1 3.6 3.4 3.5 3.3 2.6 2.3 2.2 2.1 2.1 2.5 2.7 3.0 2.9 2.4
5.6 4.6 4.0 3.3 3.3 3.8 3.8 3.8 3.6 4.6 5.3 4.0 3.2 4.9 5.0 4.0 2.8 3.7 4.5 4.5 4.2 4.2 3.4 3.3 3.0 4.0 4.4 4.2 4.2 3.3 3.2 3.6 4.2 4.1 4.4 4.9
5.5 5.2 4.2 4.4 4.4 5.0 4.3 4.0 4.2 4.7 5.1 5.0 4.7 5.0 5.2 4.2 4.0 4.4 4.1 4.8 4.5 5.1 4.2 4.2 4.7 4.2 4.6 4.7 5.1 5.0 5.0 5.6 4.8 4.6 4.6 4.9
5.0 5.1 4.0 4.3 4.3 4.7 4.2 3.7 4.3 4.1 4.5 4.8 5.3 4.5 4.5 4.4 4.2 3.9 4.2 4.8 4.5 4.3 4.0 4.2 4.9 4.8 4.2 4.0 4.7 5.2 5.4 5.9 5.7 5.1 4.7 4.8
4.2 4.0 4.0 3.7 3.6 3.9 3.7 3.8 3.8 3.8 3.9 4.2 4.3 4.2 3.9 3.9 3.8 3.6 3.7 3.8 3.9 3.9 3.7 3.8 4.1 4.2 3.7 3.5 3.7 3.8 4.1 4.4 4.5 4.3 4.2 4.5
3.4 3.3 3.3 3.4 3.3 3.0 3.0 2.8 2.7 2.8 2.9 2.9 3.2 3.1 2.9 3.0 3.1 2.9 2.6 2.8 3.0 3.0 3.3 3.2 3.0 2.9 3.2 3.1 2.9 3.1 3.1 3.1 2.9 3.0 3.3 3.3
2.6 2.6 2.7 2.6 2.6 2.5 2.5 2.4 2.4 2.5 2.6 2.7 2.6 2.5 2.4 2.6 2.7 2.3 2.6 2.8 2.7 2.4 2.9 3.4 2.7 2.4 3.2 3.7 3.9 3.7 4.0 4.4 3.4 2.8 2.5 2.6
1.9 1.9 2.0 2.4 3.3 3.1 2.9 2.8 2.6 2.6 2.2 1.9 2.0 2.1 2.1 2.5 3.2 4.7 4.9 5.5 5.9 5.0 3.7 3.2 4.1 3.9 3.3 3.6 4.4 4.7 4.1 3.5 3.1 3.0 2.7 1.9
4.1 3.8 3.7 3.7 3.5 3.3 2.9 2.5 2.3 2.6 3.2 3.6 3.8 3.9 4.0 3.5 3.4 3.3 3.5 3.5 3.3 3.1 2.8 2.8 2.7 2.5 2.6 2.9 3.2 3.0 2.6 2.4 2.7 3.2 4.2 4.2

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations

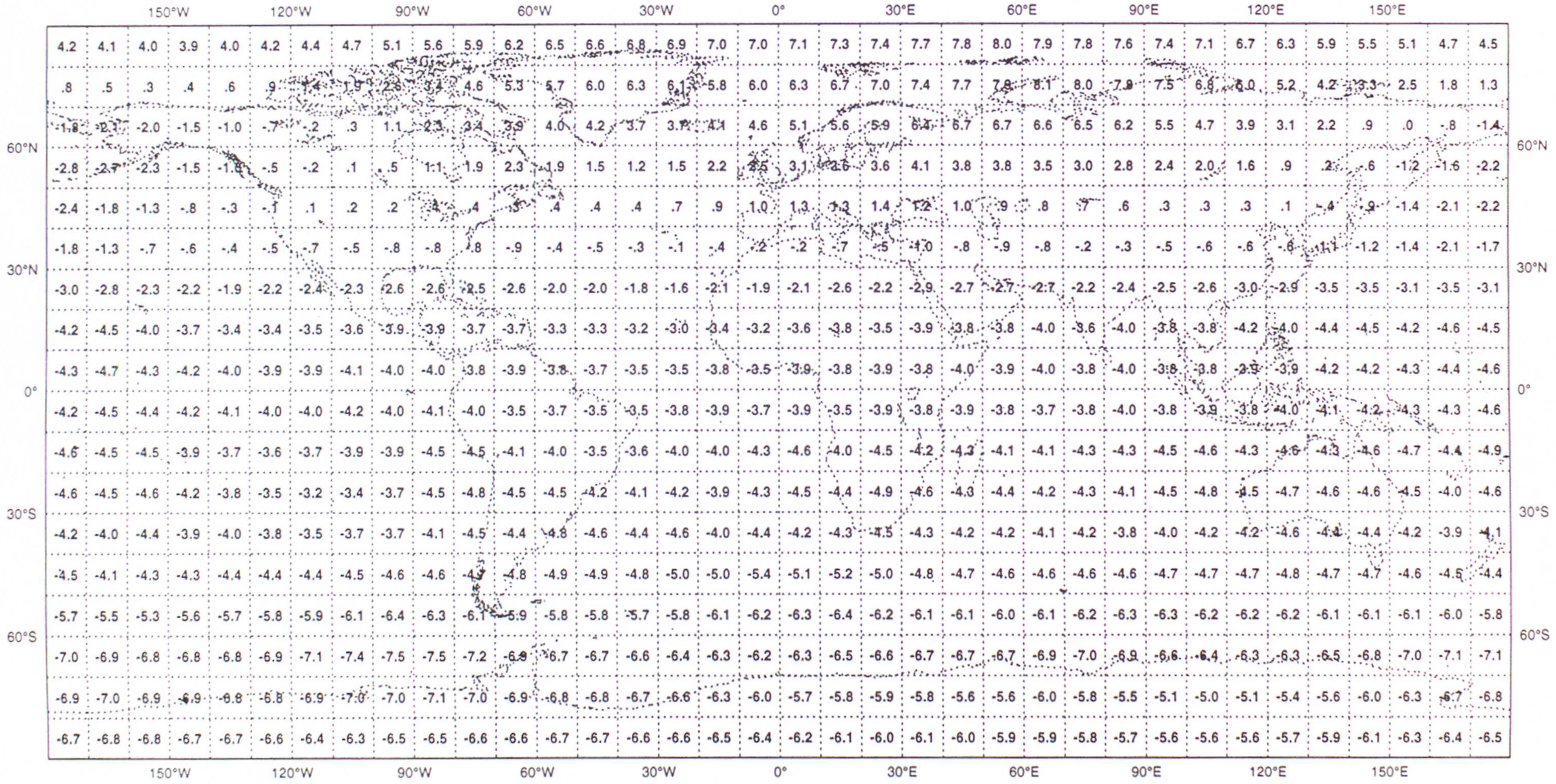
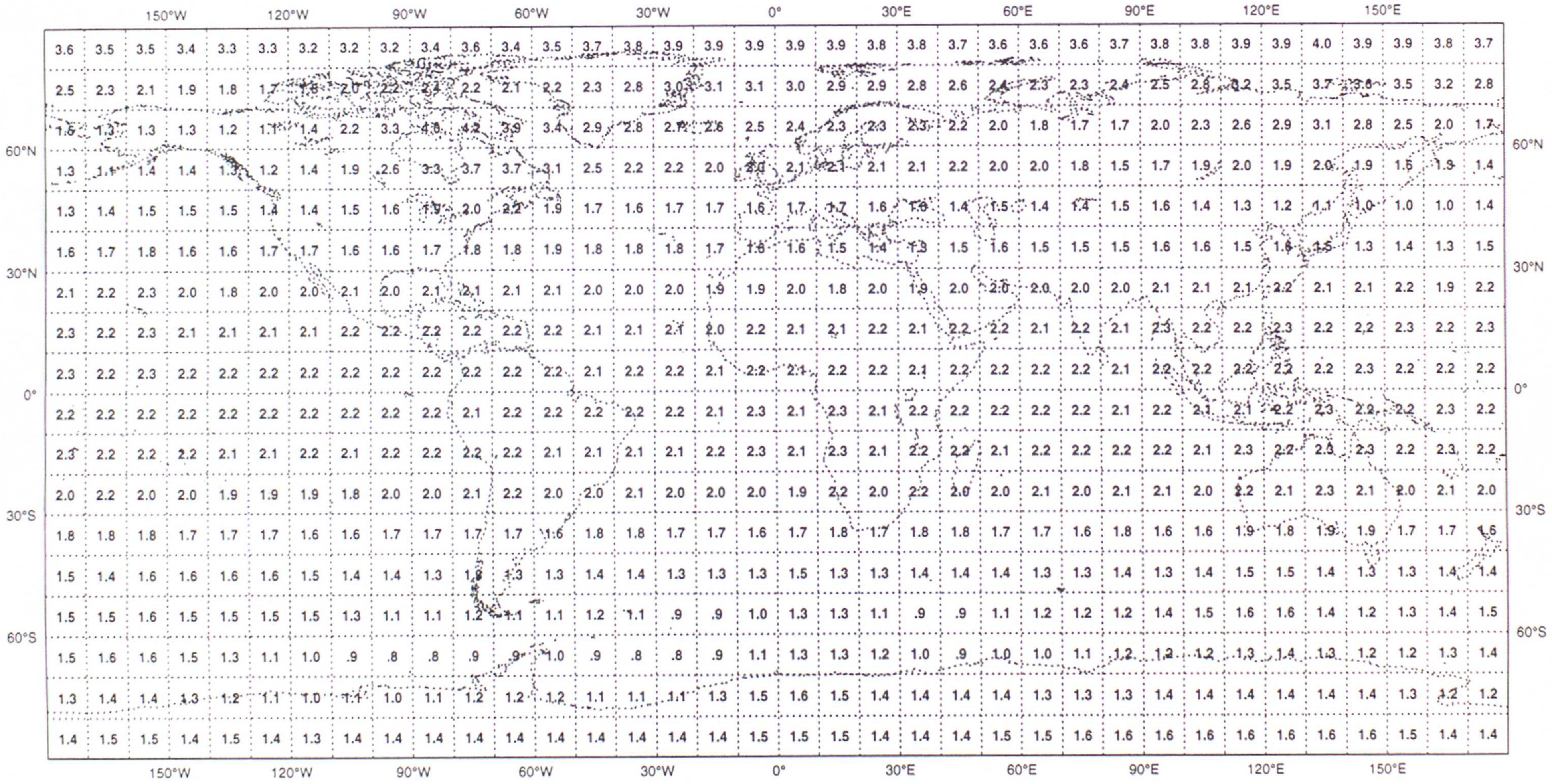

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.2 4.1 4.0 3.9 4.0 4.2 4.4 4.7 5.1 5.6 5.9 6.2 6.5 6.6 6.8 6.9 7.0 7.0 7.1 7.3 7.4 7.7 7.8 8.0 7.9 7.8 7.6 7.4 7.1 6.7 6.3 5.9 5.5 5.1 4.7 4.5
.8 .5 .3 .4 .6 .9 1.4 1.9 2.8 3.4 4.6 5.3 5.7 6.0 6.3 6.1 5.8 6.0 6.3 6.7 7.0 7.4 7.7 7.8 8.1 8.0 7.9 7.5 6.8 6.0 5.2 4.2 3.3 2.5 1.8 1.3
-1.8 -2.1 -2.0 -1.5 -1.0 -.7 -.2 .3 1.1 2.3 3.4 3.9 4.0 4.2 3.7 3.7 4.1 4.6 5.1 5.6 5.9 6.4 6.7 6.7 6.6 6.5 6.2 5.5 4.7 3.9 3.1 2.2 .9 .0 -.8 -1.4
-2.8 -2.7 -2.3 -1.5 -1.8 -.5 -.2 .1 .5 1.1 1.9 2.3 1.9 1.5 1.2 1.5 2.2 2.5 3.1 2.6 3.6 4.1 3.8 3.8 3.5 3.0 2.8 2.4 2.0 1.6 .9 .2 -.6 -1.2 -1.6 -2.2
-2.4 -1.8 -1.3 -.8 -.3 -.1 .1 .2 .2 .4 .4 .5 .4 .4 .4 .7 .9 1.0 1.3 1.3 1.4 1.2 1.0 .9 .8 .7 .6 .3 .3 .3 .1 -.4 -.9 -1.4 -2.1 -2.2
-1.8 -1.3 -.7 -.6 -.4 -.5 -.7 -.5 -.8 -.8 -.8 -.9 -.4 -.5 -.3 -.1 -.4 -.2 -.2 -.7 -.5 -1.0 -.8 -.9 -.8 -.2 -.3 -.5 -.6 -.6 -.6 -1.1 -1.2 -1.4 -2.1 -1.7
-3.0 -2.8 -2.3 -2.2 -1.9 -2.2 -2.4 -2.3 -2.6 -2.6 -2.5 -2.6 -2.0 -2.0 -1.8 -1.6 -2.1 -1.9 -2.1 -2.6 -2.2 -2.9 -2.7 -2.7 -2.7 -2.2 -2.4 -2.5 -2.6 -3.0 -2.9 -3.5 -3.5 -3.1 -3.5 -3.1
-4.2 -4.5 -4.0 -3.7 -3.4 -3.4 -3.5 -3.6 -3.9 -3.9 -3.7 -3.7 -3.3 -3.3 -3.2 -3.0 -3.4 -3.2 -3.6 -3.8 -3.5 -3.9 -3.8 -3.8 -4.0 -3.6 -4.0 -3.8 -3.8 -4.2 -4.0 -4.4 -4.5 -4.2 -4.6 -4.5
-4.3 -4.7 -4.3 -4.2 -4.0 -3.9 -3.9 -4.1 -4.0 -4.0 -3.8 -3.9 -3.8 -3.7 -3.5 -3.5 -3.8 -3.5 -3.9 -3.8 -3.9 -3.8 -4.0 -3.9 -4.0 -3.8 -4.0 -3.8 -3.8 -2.9 -3.9 -4.2 -4.2 -4.3 -4.4 -4.6
-4.2 -4.5 -4.4 -4.2 -4.1 -4.0 -4.0 -4.2 -4.0 -4.1 -4.0 -3.5 -3.7 -3.5 -3.5 -3.8 -3.9 -3.7 -3.9 -3.5 -3.9 -3.8 -3.9 -3.8 -3.7 -3.8 -4.0 -3.8 -3.9 -3.8 -4.0 -4.1 -4.2 -4.3 -4.3 -4.6
-4.6 -4.5 -4.5 -3.9 -3.7 -3.6 -3.7 -3.9 -3.9 -4.5 -4.5 -4.1 -4.0 -3.5 -3.6 -4.0 -4.0 -4.3 -4.6 -4.0 -4.5 -4.2 -4.3 -4.1 -4.1 -4.3 -4.3 -4.5 -4.6 -4.3 -4.6 -4.3 -4.6 -4.7 -4.4 -4.9
-4.6 -4.5 -4.6 -4.2 -3.8 -3.5 -3.2 -3.4 -3.7 -4.5 -4.8 -4.5 -4.5 -4.2 -4.1 -4.2 -3.9 -4.3 -4.5 -4.4 -4.9 -4.6 -4.3 -4.4 -4.2 -4.3 -4.1 -4.5 -4.8 -4.5 -4.7 -4.6 -4.6 -4.5 -4.0 -4.6
-4.2 -4.0 -4.4 -3.9 -4.0 -3.8 -3.5 -3.7 -3.7 -4.1 -4.5 -4.4 -4.8 -4.6 -4.4 -4.6 -4.0 -4.4 -4.2 -4.3 -4.5 -4.3 -4.2 -4.2 -4.1 -4.2 -3.8 -4.0 -4.2 -4.2 -4.6 -4.4 -4.4 -4.2 -3.9 -4.1
-4.5 -4.1 -4.3 -4.3 -4.4 -4.4 -4.4 -4.5 -4.6 -4.6 -4.7 -4.8 -4.9 -4.9 -4.8 -5.0 -5.0 -5.4 -5.1 -5.2 -5.0 -4.8 -4.7 -4.6 -4.6 -4.6 -4.6 -4.7 -4.7 -4.7 -4.8 -4.7 -4.7 -4.6 -4.5 -4.4
-5.7 -5.5 -5.3 -5.6 -5.7 -5.8 -5.9 -6.1 -6.4 -6.3 -6.1 -5.9 -5.8 -5.8 -5.7 -5.8 -6.1 -6.2 -6.3 -6.4 -6.2 -6.1 -6.1 -6.0 -6.1 -6.2 -6.3 -6.3 -6.2 -6.2 -6.2 -6.1 -6.1 -6.1 -6.0 -5.8
-7.0 -6.9 -6.8 -6.8 -6.8 -6.9 -7.1 -7.4 -7.5 -7.5 -7.2 -6.9 -6.7 -6.7 -6.6 -6.4 -6.3 -6.2 -6.3 -6.5 -6.6 -6.7 -6.7 -6.7 -6.9 -7.0 -6.9 -6.6 -6.4 -6.3 -6.3 -6.5 -6.8 -7.0 -7.1 -7.1
-6.9 -7.0 -6.9 -6.9 -6.8 -6.8 -6.9 -7.0 -7.0 -7.1 -7.0 -6.9 -6.8 -6.8 -6.7 -6.6 -6.3 -6.0 -5.7 -5.8 -5.9 -5.8 -5.6 -5.6 -6.0 -5.8 -5.5 -5.1 -5.0 -5.1 -5.4 -5.6 -6.0 -6.3 -6.7 -6.8
-6.7 -6.8 -6.8 -6.7 -6.7 -6.6 -6.4 -6.3 -6.5 -6.5 -6.6 -6.6 -6.7 -6.7 -6.6 -6.6 -6.5 -6.4 -6.2 -6.1 -6.0 -6.1 -6.0 -5.9 -5.9 -5.8 -5.7 -5.6 -5.6 -5.6 -5.7 -5.9 -6.1 -6.3 -6.4 -6.5

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



3.6	3.5	3.5	3.4	3.3	3.3	3.2	3.2	3.2	3.4	3.6	3.4	3.5	3.7	3.8	3.9	3.9	3.9	3.9	3.9	3.8	3.8	3.7	3.6	3.6	3.6	3.7	3.8	3.8	3.9	3.9	4.0	3.9	3.9	3.8	3.7
2.5	2.3	2.1	1.9	1.8	1.7	1.8	2.0	2.2	2.4	2.2	2.1	2.2	2.3	2.8	3.0	3.1	3.1	3.0	2.9	2.9	2.8	2.6	2.4	2.3	2.3	2.4	2.5	2.8	3.2	3.5	3.7	3.6	3.5	3.2	2.8
1.6	1.3	1.3	1.3	1.2	1.1	1.4	2.2	3.3	4.0	4.2	3.9	3.4	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.3	2.3	2.2	2.0	1.8	1.7	1.7	2.0	2.3	2.6	2.9	3.1	2.8	2.5	2.0	1.7
1.3	1.1	1.4	1.4	1.3	1.2	1.4	1.9	2.6	3.3	3.7	3.7	3.1	2.5	2.2	2.2	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.0	2.0	1.8	1.5	1.7	1.9	2.0	1.9	2.0	1.9	1.5	1.9	1.4
1.3	1.4	1.5	1.5	1.5	1.4	1.4	1.5	1.6	1.9	2.0	2.2	1.9	1.7	1.6	1.7	1.7	1.6	1.7	1.7	1.6	1.8	1.4	1.5	1.4	1.4	1.5	1.6	1.4	1.3	1.2	1.1	1.0	1.0	1.0	1.4
1.6	1.7	1.8	1.6	1.6	1.7	1.7	1.6	1.6	1.7	1.8	1.8	1.9	1.8	1.8	1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.5	1.6	1.5	1.5	1.5	1.6	1.6	1.5	1.6	1.5	1.3	1.4	1.3	1.5
2.1	2.2	2.3	2.0	1.8	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	2.0	1.8	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.2	1.9	2.2
2.3	2.2	2.3	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.3
2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2
2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.1	2.3	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.3	2.2	2.2	2.3	2.2
2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.1	2.3	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.3	2.2	2.3	2.3	2.2	2.3	2.2
2.0	2.2	2.0	2.0	1.9	1.9	1.9	1.8	2.0	2.0	2.1	2.2	2.0	2.0	2.1	2.0	2.0	2.0	1.9	2.2	2.0	2.2	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.2	2.1	2.3	2.1	2.0	2.1	2.0
1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.7	1.7	1.7	1.7	1.6	1.8	1.8	1.7	1.7	1.6	1.7	1.8	1.7	1.8	1.8	1.7	1.7	1.6	1.8	1.6	1.6	1.9	1.8	1.9	1.9	1.7	1.7	1.6
1.5	1.4	1.6	1.6	1.6	1.6	1.5	1.4	1.4	1.3	1.8	1.3	1.3	1.4	1.4	1.3	1.3	1.3	1.5	1.3	1.3	1.4	1.4	1.4	1.3	1.3	1.4	1.3	1.4	1.5	1.5	1.4	1.3	1.3	1.4	1.4
1.5	1.5	1.6	1.5	1.5	1.5	1.5	1.3	1.1	1.1	1.2	1.1	1.1	1.2	1.1	.9	.9	1.0	1.3	1.3	1.1	.9	.9	1.1	1.2	1.2	1.2	1.4	1.5	1.6	1.6	1.4	1.2	1.3	1.4	1.5
1.5	1.6	1.6	1.5	1.3	1.1	1.0	.9	.8	.8	.9	.9	1.0	.9	.8	.8	.9	1.1	1.3	1.3	1.2	1.0	.9	1.0	1.0	1.1	1.2	1.2	1.2	1.3	1.4	1.3	1.2	1.2	1.3	1.4
1.3	1.4	1.4	1.3	1.2	1.1	1.0	1.1	1.0	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.3	1.5	1.6	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.2	1.2
1.4	1.5	1.5	1.4	1.5	1.4	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.4	1.4	1.4	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.4	1.4

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

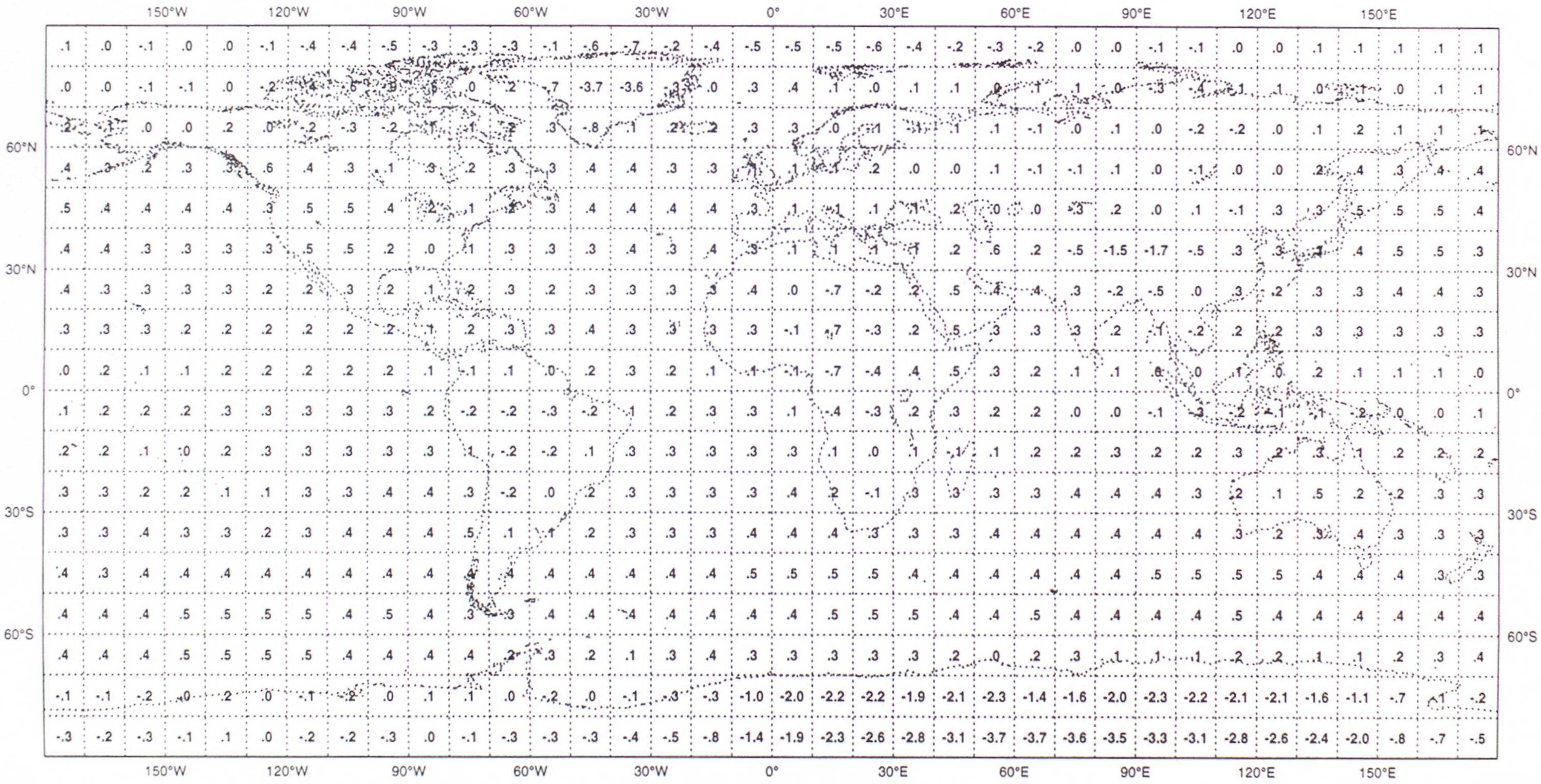

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.1 .0 -.1 .0 .0 -.1 -.4 -.4 -.5 -.3 -.3 -.3 -.1 -.6 -.7 -.2 -.4 -.5 -.5 -.5 -.6 -.4 -.2 -.3 -.2 .0 .0 -.1 -.1 .0 .0 .1 .1 .1 .1 .1
.0 .0 -.1 -.1 .0 -.2 .4 .6 .9 .5 .0 .2 -.7 -3.7 -3.6 -.3 .0 .3 .4 .1 .0 .1 .1 .0 .1 .1 .0 -.3 -.4 -.1 .1 .0 -.1 .0 .1 .1
.2 -.1 .0 .0 .2 .0 -.2 -.3 -.2 .1 .1 .2 .3 -.8 .1 .2 .2 .3 .3 .0 .1 .1 .1 .1 -.1 .0 .1 .0 -.2 -.2 .0 .1 .2 .1 .1 .1
.4 .3 .2 .3 .3 .6 .4 .3 .1 .3 .2 .3 .3 .4 .4 .3 .3 .1 .1 .1 .2 .0 .0 .1 -.1 -.1 .1 .0 -.1 .0 .0 .2 .4 .3 .4 .4
.5 .4 .4 .4 .4 .3 .5 .5 .4 .2 .1 .2 .3 .4 .4 .4 .4 .3 .1 -.1 .1 .1 .2 .0 .0 .3 .2 .0 .1 -.1 .3 .3 .5 .5 .5 .4
.4 .4 .3 .3 .3 .3 .5 .5 .2 .0 .1 .3 .3 .3 .4 .3 .4 .3 .1 .1 .1 .1 .2 .6 .2 -.5 -1.5 -1.7 -.5 .3 .3 .4 .4 .5 .5 .3
.4 .3 .3 .3 .3 .2 .2 .3 .2 .1 .2 .3 .2 .3 .3 .3 .3 .4 .0 -.7 -.2 .2 .5 .4 .4 .3 -.2 -.5 .0 .3 .2 .3 .3 .4 .4 .3
.3 .3 .3 .2 .2 .2 .2 .2 .2 .1 .2 .3 .3 .4 .3 .3 .3 .3 -.1 .7 -.3 .2 .5 .3 .3 .3 .2 -.1 -.2 .2 .2 .3 .3 .3 .3 .3
.0 .2 .1 .1 .2 .2 .2 .2 .2 .1 -.1 .1 .0 .2 .3 .2 .1 .1 -.1 -.7 -.4 .4 .5 .3 .2 .1 .1 .0 .0 .1 .0 .2 .1 .1 .1 .0
.1 .2 .2 .2 .3 .3 .3 .3 .3 .2 -.2 -.2 -.3 -.2 .1 .2 .3 .3 .1 -.4 -.3 .2 .3 .2 .2 .0 .0 -.1 -.3 -.2 -.1 -.1 -.2 .0 .0 .1
.2 .2 .1 .0 .2 .3 .3 .3 .3 .3 .1 -.2 -.2 .1 .3 .3 .3 .3 .3 .1 .0 .1 -.1 .1 .2 .2 .3 .2 .2 .3 .2 .3 .1 .2 .2 .2
.3 .3 .2 .2 .1 .1 .3 .3 .4 .4 .3 -.2 .0 .2 .3 .3 .3 .3 .4 .2 -.1 .3 .3 .3 .3 .4 .4 .4 .3 .2 .1 .5 .2 -.2 .3 .3
.3 .3 .4 .3 .3 .2 .3 .4 .4 .4 .5 .1 .1 .2 .3 .3 .3 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .2 .3 .4 .3 .3 .3
.4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .3 .3
.4 .4 .4 .5 .5 .5 .5 .4 .5 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .5 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4
.4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .2 .3 .2 .1 .3 .4 .3 .3 .3 .3 .3 .2 .0 .2 .3 .1 .1 -.1 -.2 .2 .1 .1 .2 .3 .4
-.1 -.1 -.2 .0 .2 .0 -.1 -.2 .0 .1 .1 .0 -.2 .0 -.1 -.3 -.3 -1.0 -2.0 -2.2 -2.2 -1.9 -2.1 -2.3 -1.4 -1.6 -2.0 -2.3 -2.2 -2.1 -2.1 -1.6 -1.1 -.7 -.1 -.2
-.3 -.2 -.3 -.1 .1 .0 -.2 -.2 -.3 .0 -.1 -.3 -.3 -.3 -.4 -.5 -.8 -1.4 -1.9 -2.3 -2.6 -2.8 -3.1 -3.7 -3.7 -3.6 -3.5 -3.3 -3.1 -2.8 -2.6 -2.4 -2.0 -.8 -.7 -.5

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

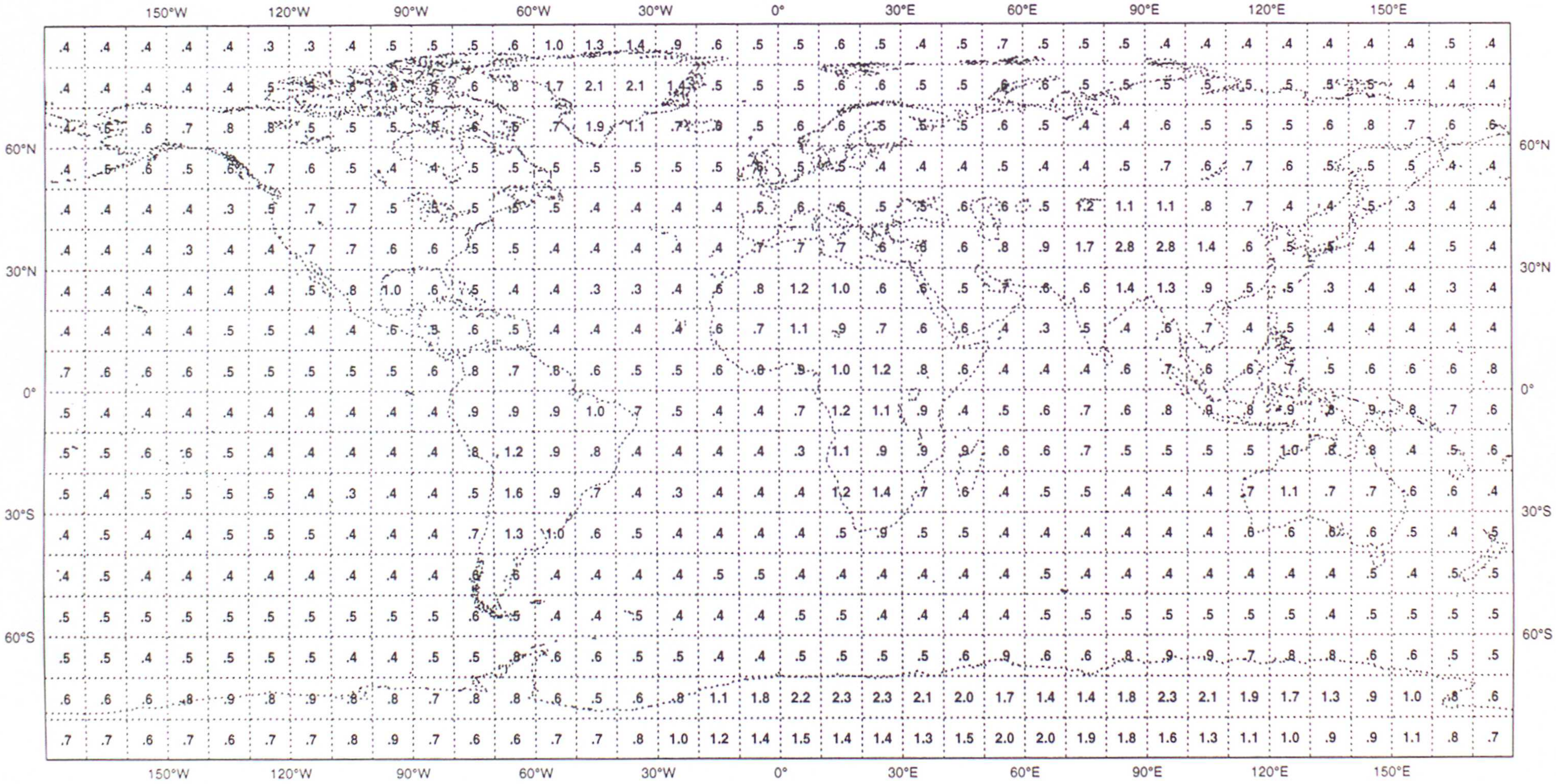

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.4 .4 .4 .4 .4 .3 .3 .4 .5 .5 .5 .6 1.0 1.3 1.4 .9 .6 .5 .5 .6 .5 .4 .5 .7 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .5 .4
.4 .4 .4 .4 .4 .5 .5 .5 .8 .5 .6 .8 1.7 2.1 2.1 1.4 .5 .5 .5 .6 .6 .5 .5 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4
.4 .6 .6 .7 .8 .8 .5 .5 .5 .5 .6 .5 .7 1.9 1.1 .7 .8 .5 .6 .6 .5 .5 .5 .6 .5 .4 .4 .6 .5 .5 .5 .6 .8 .7 .6 .6
.4 .5 .6 .5 .6 .7 .6 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .4 .4 .4 .5 .4 .4 .5 .7 .6 .7 .6 .5 .5 .5 .4 .4
.4 .4 .4 .4 .3 .5 .7 .7 .5 .5 .5 .5 .5 .4 .4 .4 .4 .5 .6 .6 .5 .5 .6 .6 .5 1.2 1.1 1.1 .8 .7 .4 .4 .5 .3 .4 .4
.4 .4 .4 .3 .4 .4 .7 .7 .6 .6 .5 .5 .4 .4 .4 .4 .4 .7 .7 .7 .6 .6 .6 .8 .9 1.7 2.8 2.8 1.4 .6 .5 .5 .4 .4 .5 .4
.4 .4 .4 .4 .4 .4 .5 .8 1.0 .6 .5 .4 .4 .3 .3 .4 .6 .8 1.2 1.0 .6 .6 .5 .7 .6 .6 1.4 1.3 .9 .5 .5 .3 .4 .4 .3 .4
.4 .4 .4 .4 .5 .5 .4 .4 .6 .3 .6 .5 .4 .4 .4 .4 .6 .7 1.1 .9 .7 .6 .6 .4 .3 .5 .4 .6 .7 .4 .5 .4 .4 .4 .4 .4
.7 .6 .6 .6 .5 .5 .5 .5 .5 .6 .8 .7 .8 .6 .5 .5 .6 .8 .9 1.0 1.2 .8 .6 .4 .4 .4 .6 .7 .6 .6 .7 .5 .6 .6 .6 .8
.5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .9 .9 .9 1.0 .7 .5 .4 .4 .7 1.2 1.1 .9 .4 .5 .6 .7 .6 .8 .8 .8 .9 .8 .9 .8 .7 .6
.5 .5 .6 .6 .5 .4 .4 .4 .4 .4 .8 1.2 .9 .8 .4 .4 .4 .4 .3 1.1 .9 .9 .9 .6 .6 .7 .5 .5 .5 .5 1.0 .8 .8 .4 .5 .6
.5 .4 .5 .5 .5 .5 .4 .3 .4 .4 .5 1.6 .9 .7 .4 .3 .4 .4 .4 1.2 1.4 .7 .6 .4 .5 .5 .4 .4 .4 .7 1.1 .7 .7 .6 .6 .4
.4 .5 .4 .4 .5 .5 .5 .4 .4 .4 .7 1.3 1.0 .6 .5 .4 .4 .4 .4 .5 .9 .5 .5 .4 .4 .4 .4 .4 .4 .8 .6 .6 .6 .5 .4 .5
.4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .6 .6 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .5 .4 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .4 .4 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5
.5 .5 .4 .5 .5 .5 .5 .4 .4 .5 .5 .8 .6 .6 .5 .5 .4 .4 .5 .5 .5 .5 .6 .9 .6 .6 .8 .9 .9 .7 .8 .8 .6 .6 .5 .5
.6 .6 .6 .8 .9 .8 .9 .8 .8 .7 .8 .8 .6 .5 .6 .8 1.1 1.8 2.2 2.3 2.3 2.1 2.0 1.7 1.4 1.4 1.8 2.3 2.1 1.9 1.7 1.3 .9 1.0 .8 .6
.7 .7 .6 .7 .6 .7 .7 .8 .9 .7 .6 .6 .7 .7 .8 1.0 1.2 1.4 1.5 1.4 1.4 1.3 1.5 2.0 2.0 1.9 1.8 1.6 1.3 1.1 1.0 .9 .9 1.1 .8 .7

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

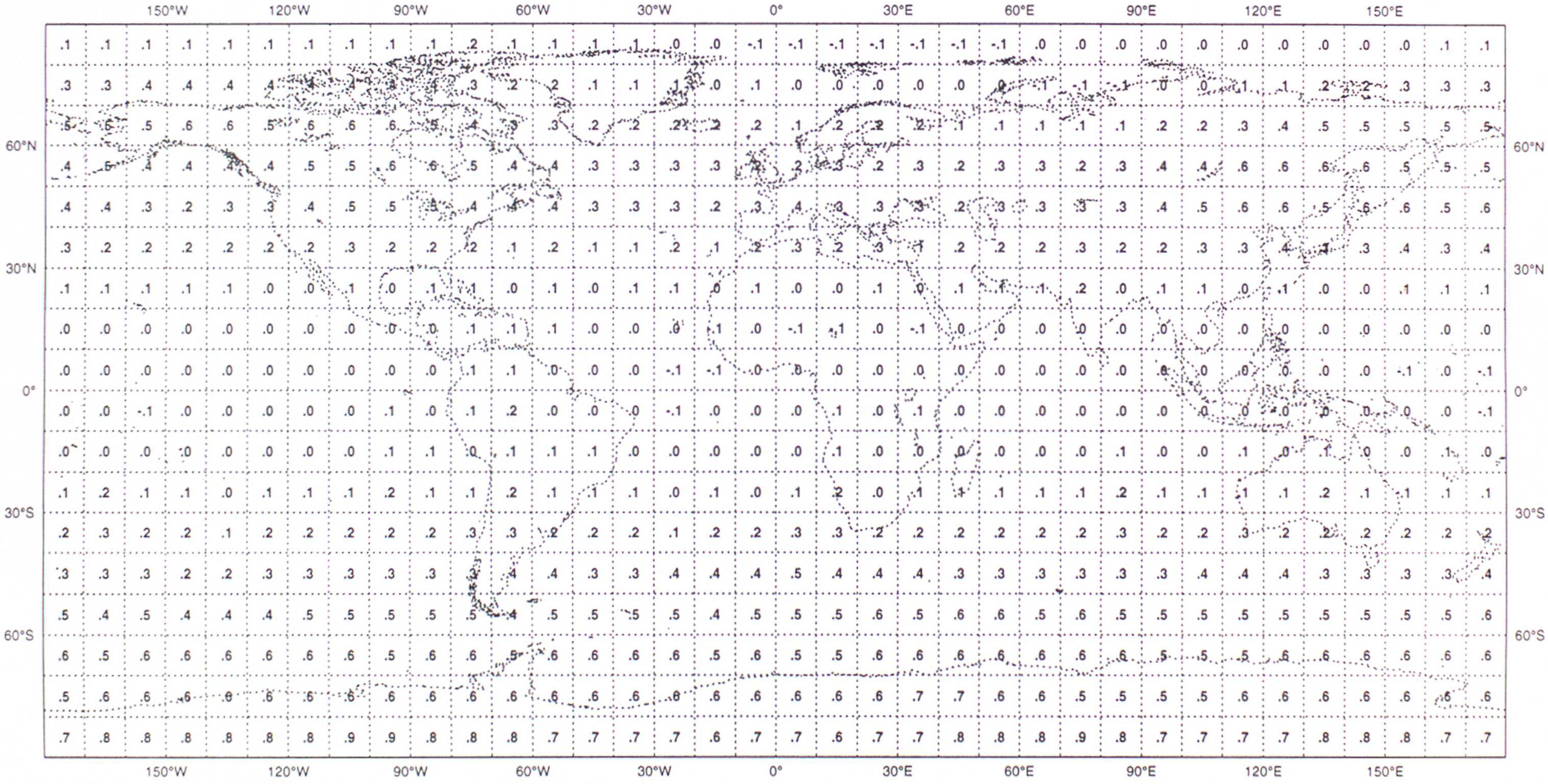

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

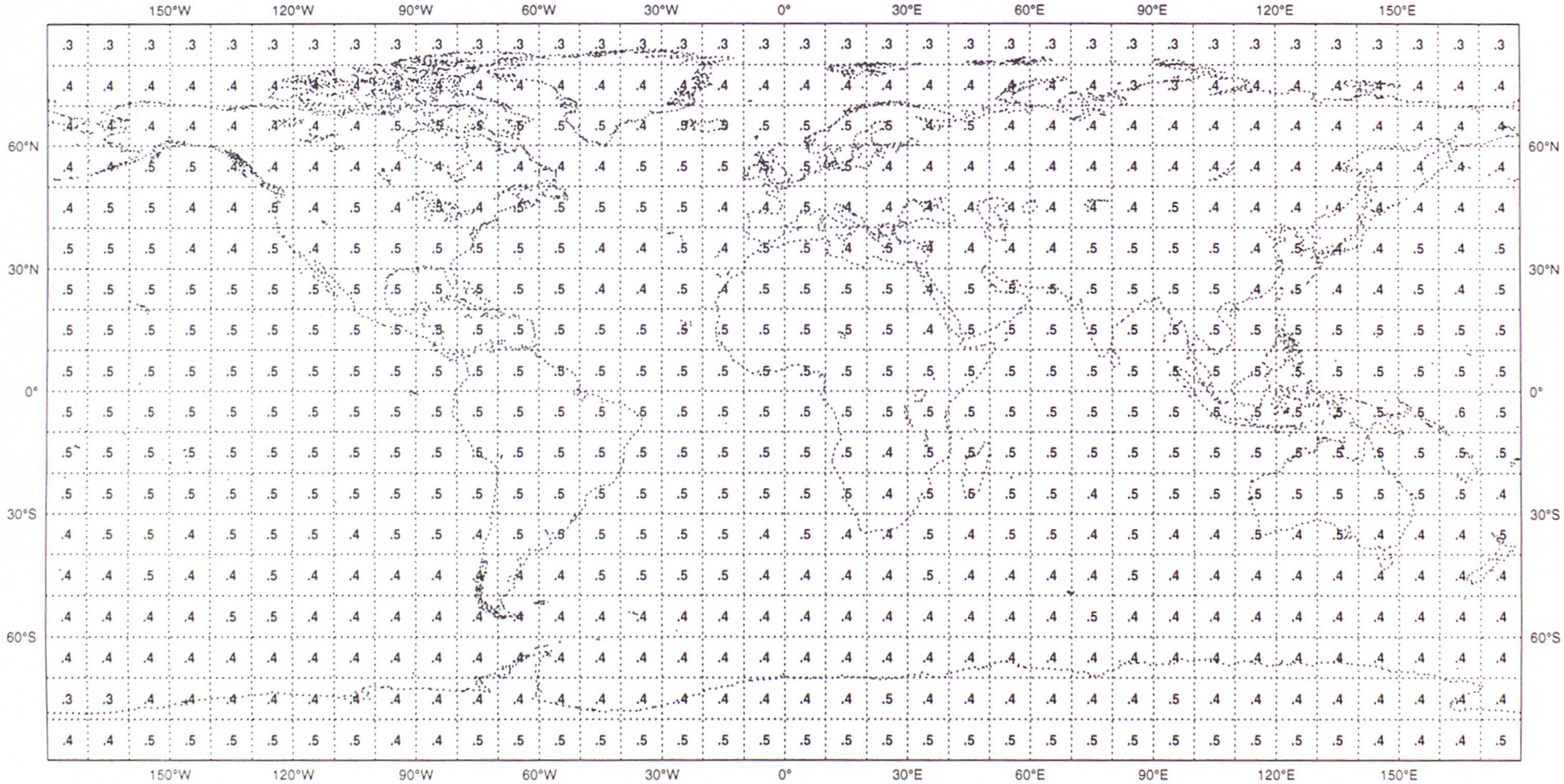

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .6 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .5 .5 .4 .4 .5 .4 .5 .4 .5 .4 .5 .5 .5 .5 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4
.5 .5 .5 .4 .4 .5 .4 .5 .5 .5 .5 .5 .5 .4 .4 .5 .4 .5 .5 .4 .5 .4 .4 .4 .4 .5 .5 .5 .5 .4 .5 .4 .4 .5 .4 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .4 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .4 .5 .4 .4 .5 .4 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .6 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4
.4 .5 .5 .4 .5 .5 .5 .4 .5 .5 .4 .5 .5 .5 .5 .5 .5 .4 .5 .4 .4 .5 .4 .5 .5 .4 .5 .4 .4 .5 .4 .5 .4 .4 .4 .5
.4 .4 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .5

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

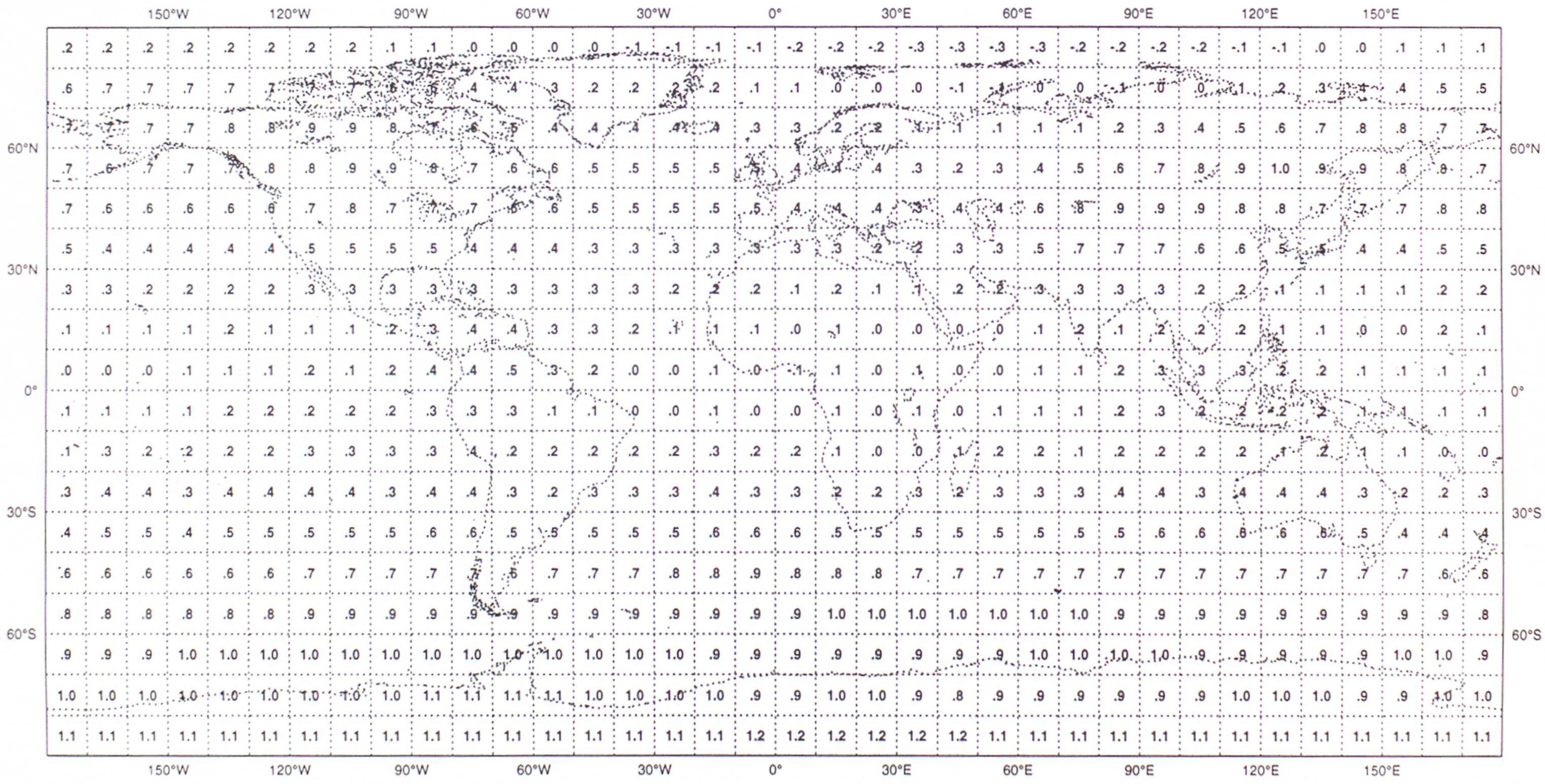

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

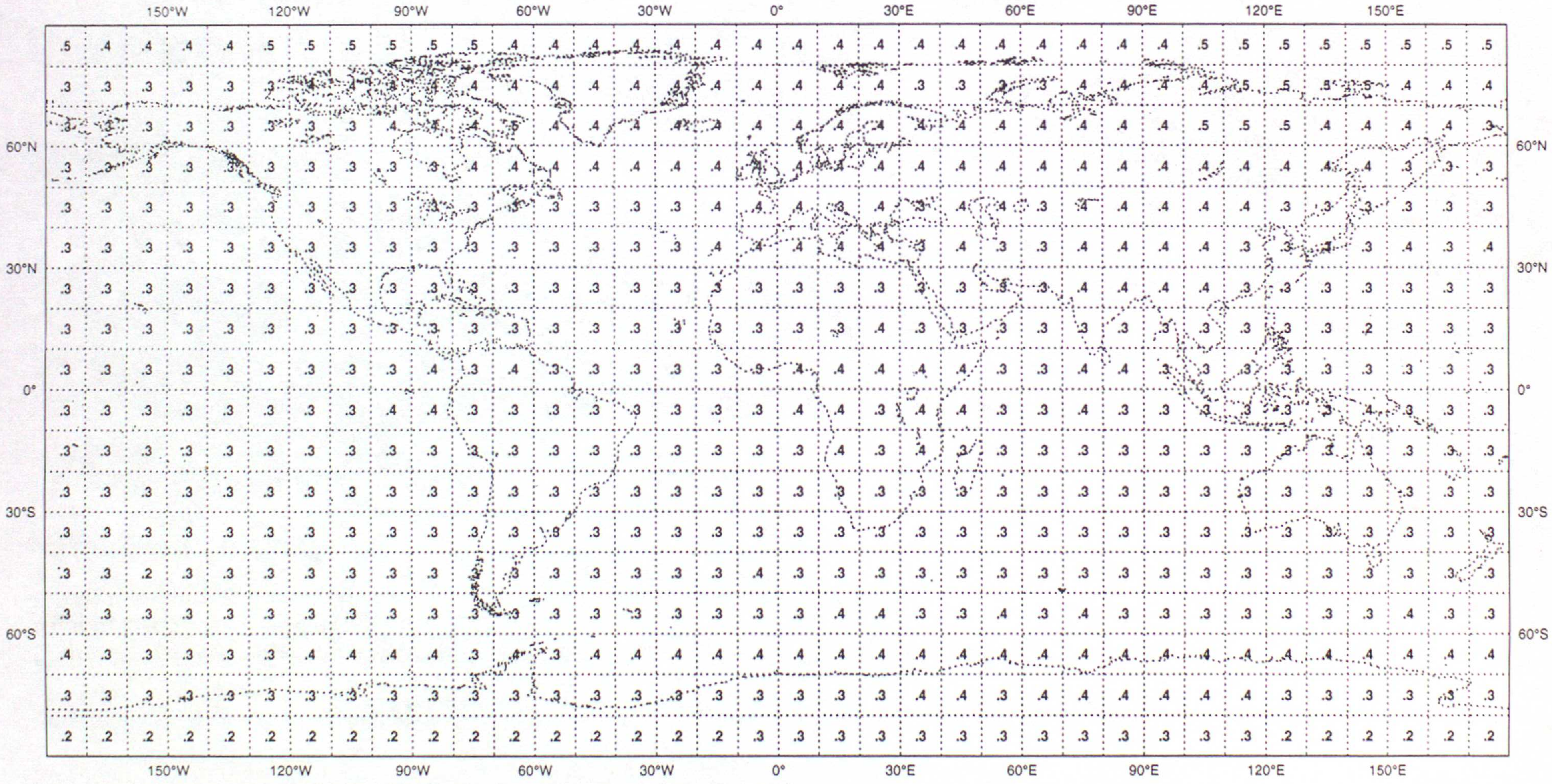
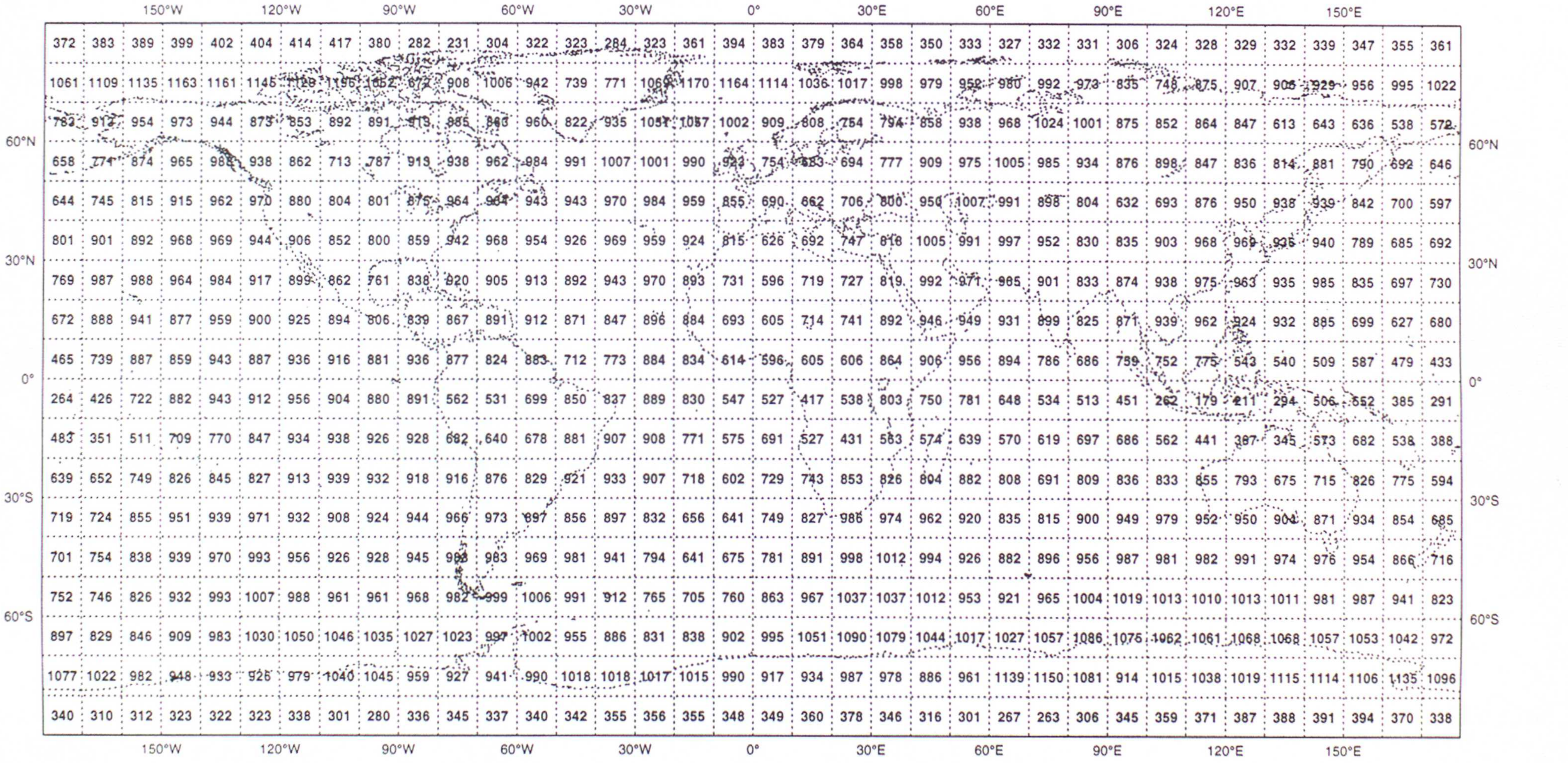
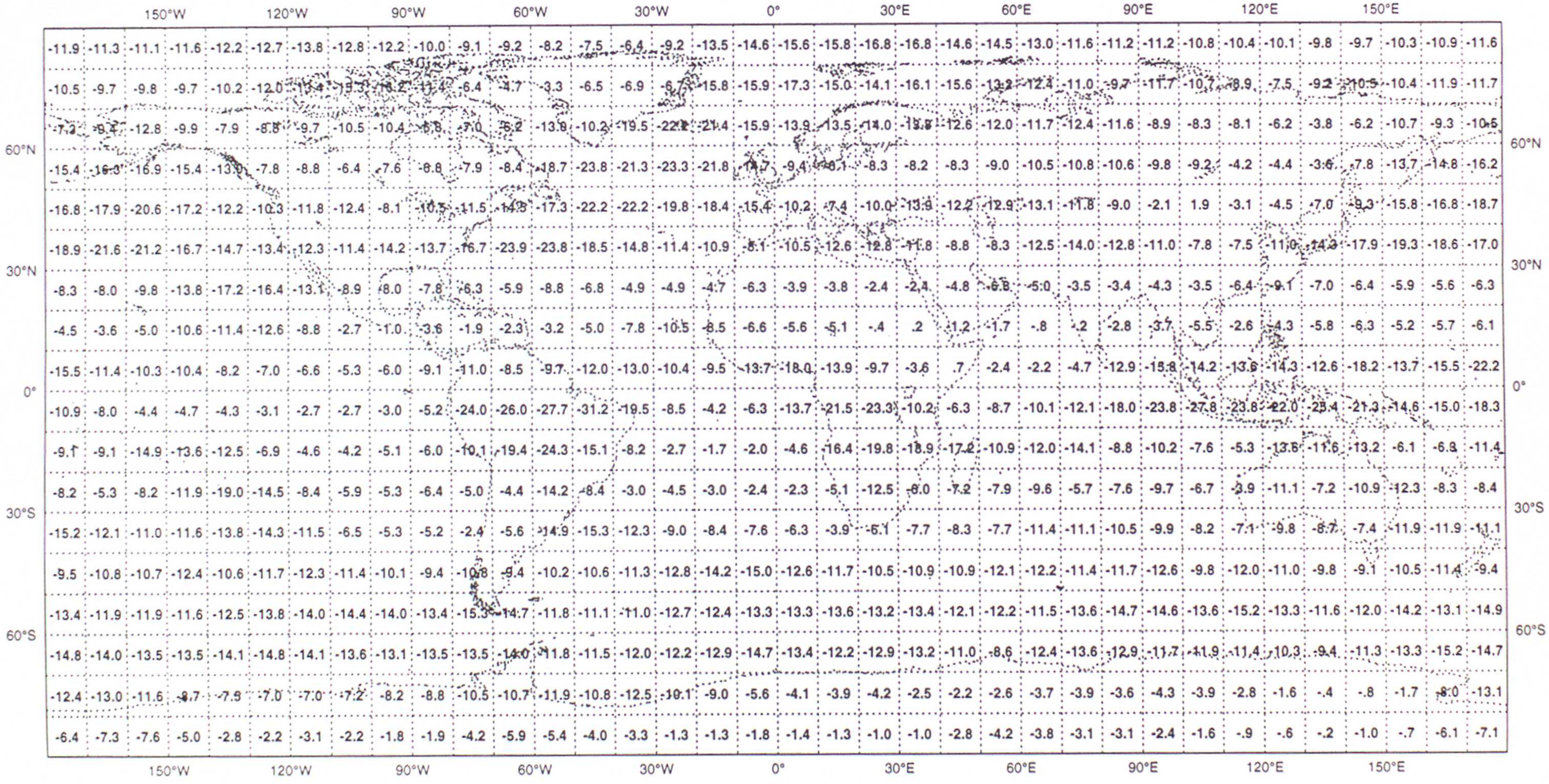

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 40. ATOVS mean daily count. FEBRUARY 2003
NOAA16, using all observations
Global average number of observations in 24 hours = 519589



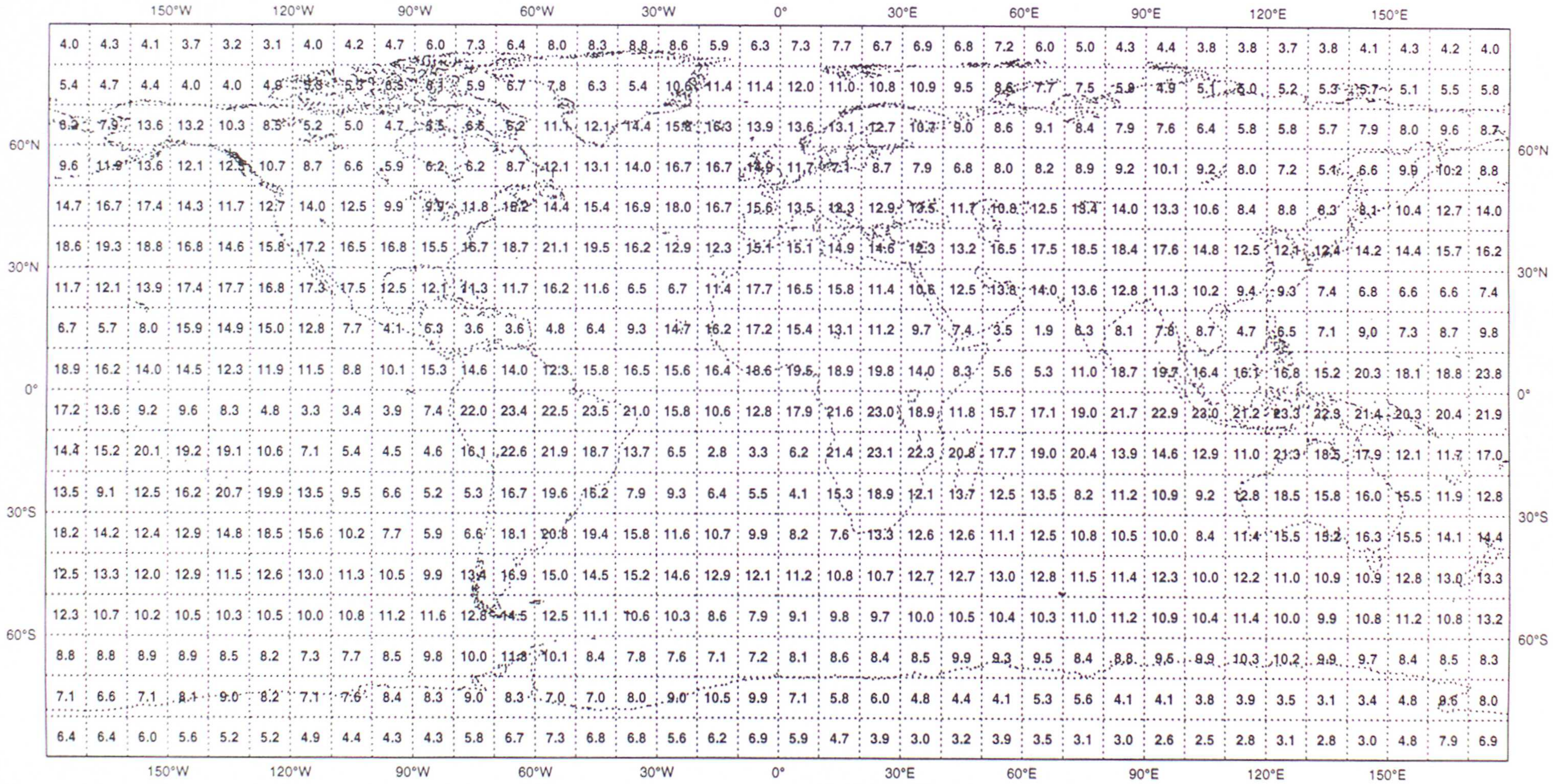
372	383	389	399	402	404	414	417	380	282	231	304	322	323	284	323	361	394	383	379	364	358	350	333	327	332	331	306	324	328	329	332	339	347	355	361
1061	1109	1135	1163	1161	1145	1128	1196	1052	872	908	1006	942	739	771	1069	1170	1164	1114	1036	1017	998	979	952	980	992	973	835	748	875	907	905	929	956	995	1022
783	912	954	973	944	873	853	892	891	913	885	863	960	822	935	1051	1057	1002	909	608	754	794	858	938	968	1024	1001	875	852	864	847	613	643	636	538	572
658	774	874	965	988	938	862	713	787	913	938	962	984	991	1007	1001	990	923	754	583	694	777	909	975	1005	985	934	876	898	847	836	814	881	790	692	646
644	745	815	915	962	970	880	804	801	875	964	964	943	943	970	984	959	855	690	662	706	800	950	1007	991	898	804	632	693	876	950	938	939	842	700	597
801	901	892	968	969	944	906	852	800	859	942	968	954	926	969	959	924	815	626	692	747	816	1005	991	997	952	830	835	903	968	969	935	940	789	685	692
769	987	988	964	984	917	899	862	761	838	920	905	913	892	943	970	893	731	596	719	727	819	992	971	965	901	833	874	938	975	963	935	985	835	697	730
672	888	941	877	959	900	925	894	806	839	867	891	912	871	847	896	884	693	605	714	741	892	946	949	931	899	825	871	939	962	924	932	885	699	627	680
465	739	887	859	943	887	936	916	881	936	877	824	883	712	773	884	834	614	596	605	606	864	906	956	894	786	686	759	752	775	543	540	509	587	479	433
264	426	722	882	943	912	956	904	880	891	562	531	699	850	837	889	830	547	527	417	538	803	750	781	648	534	513	451	262	179	211	294	506	552	385	291
483	351	511	709	770	847	934	938	926	928	682	640	678	881	907	908	771	575	691	527	431	583	574	639	570	619	697	686	562	441	387	345	573	682	538	388
639	652	749	826	845	827	913	939	932	918	916	876	829	921	933	907	718	602	729	743	853	826	804	882	808	691	809	836	833	855	793	675	715	826	775	594
719	724	855	951	939	971	932	908	924	944	966	973	897	856	897	832	656	641	749	827	986	974	962	920	835	815	900	949	979	952	950	904	871	934	854	685
701	754	838	939	970	993	956	926	928	945	988	983	969	981	941	794	641	675	781	891	998	1012	994	926	882	896	956	987	981	982	991	974	976	954	866	716
752	746	826	932	993	1007	988	961	961	968	982	999	1006	991	912	765	705	760	863	967	1037	1037	1012	953	921	965	1004	1019	1013	1010	1013	1011	981	987	941	823
897	829	846	909	983	1030	1050	1046	1035	1027	1023	997	1002	955	886	831	838	902	995	1051	1090	1079	1044	1017	1027	1057	1086	1076	1062	1061	1068	1068	1057	1053	1042	972
1077	1022	982	948	933	926	979	1040	1045	959	927	941	990	1018	1018	1017	1015	990	917	934	987	978	886	961	1139	1150	1081	914	1015	1038	1019	1115	1114	1106	1135	1096
340	310	312	323	322	323	338	301	280	336	345	337	340	342	355	356	355	348	349	360	378	346	316	301	267	263	306	345	359	371	387	388	391	394	370	338

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



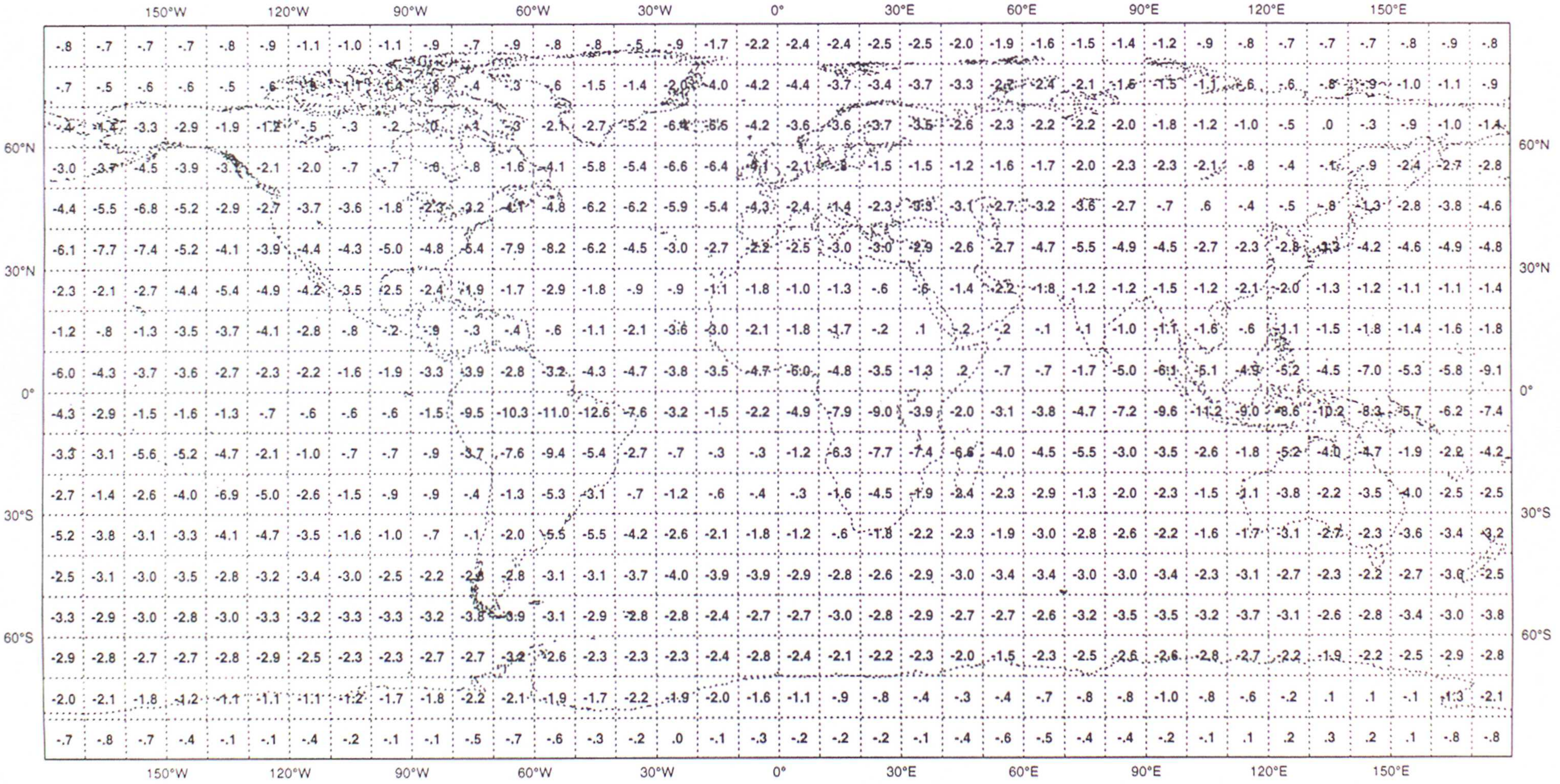
-11.9	-11.3	-11.1	-11.6	-12.2	-12.7	-13.8	-12.8	-12.2	-10.0	-9.1	-9.2	-8.2	-7.5	-6.4	-9.2	-13.5	-14.6	-15.6	-15.8	-16.8	-16.8	-14.6	-14.5	-13.0	-11.6	-11.2	-11.2	-10.8	-10.4	-10.1	-9.8	-9.7	-10.3	-10.9	-11.6
-10.5	-9.7	-9.8	-9.7	-10.2	-12.0	-13.4	-13.3	-16.2	-11.4	-6.4	-4.7	-3.3	-6.5	-6.9	-6.7	-15.8	-15.9	-17.3	-15.0	-14.1	-16.1	-15.6	-13.2	-12.4	-11.0	-9.7	-11.7	-10.7	-8.9	-7.5	-9.2	-10.5	-10.4	-11.9	-11.7
-7.2	-9.4	-12.8	-9.9	-7.9	-8.8	-9.7	-10.5	-10.4	-8.8	-7.0	-6.2	-13.8	-10.2	-19.5	-22.1	-21.4	-15.9	-13.9	-13.5	-14.0	-13.8	-12.6	-12.0	-11.7	-12.4	-11.6	-8.9	-8.3	-8.1	-6.2	-3.8	-6.2	-10.7	-9.3	-10.5
-15.4	-16.3	-16.9	-15.4	-13.0	-7.8	-8.8	-6.4	-7.6	-8.8	-7.9	-8.4	-18.7	-23.8	-21.3	-23.3	-21.8	-14.7	-9.4	-8.1	-8.3	-8.2	-8.3	-9.0	-10.5	-10.8	-10.6	-9.8	-9.2	-4.2	-4.4	-3.6	-7.8	-13.7	-14.8	-16.2
-16.8	-17.9	-20.6	-17.2	-12.2	-10.3	-11.8	-12.4	-8.1	-10.5	-11.5	-14.5	-17.3	-22.2	-22.2	-19.8	-18.4	-15.4	-10.2	-7.4	-10.0	-13.9	-12.2	-12.9	-13.1	-11.8	-9.0	-2.1	1.9	-3.1	-4.5	-7.0	-9.3	-15.8	-16.8	-18.7
-18.9	-21.6	-21.2	-16.7	-14.7	-13.4	-12.3	-11.4	-14.2	-13.7	-16.7	-23.9	-23.8	-18.5	-14.8	-11.4	-10.9	-8.1	-10.5	-12.6	-12.8	-11.8	-8.8	-8.3	-12.5	-14.0	-12.8	-11.0	-7.8	-7.5	-11.0	-14.3	-17.9	-19.3	-18.6	-17.0
-8.3	-8.0	-9.8	-13.8	-17.2	-16.4	-13.1	-8.9	-8.0	-7.8	-6.3	-5.9	-8.8	-6.8	-4.9	-4.9	-4.7	-6.3	-3.9	-3.8	-2.4	-2.4	-4.8	-6.8	-5.0	-3.5	-3.4	-4.3	-3.5	-6.4	-9.1	-7.0	-6.4	-5.9	-5.6	-6.3
-4.5	-3.6	-5.0	-10.6	-11.4	-12.6	-8.8	-2.7	-1.0	-3.6	-1.9	-2.3	-3.2	-5.0	-7.8	-10.5	-8.5	-6.6	-5.6	-5.1	-.4	.2	-1.2	-1.7	-.8	-.2	-2.8	-3.7	-5.5	-2.6	-4.3	-5.8	-6.3	-5.2	-5.7	-6.1
-15.5	-11.4	-10.3	-10.4	-8.2	-7.0	-6.6	-5.3	-6.0	-9.1	-11.0	-8.5	-9.7	-12.0	-13.0	-10.4	-9.5	-13.7	-18.0	-13.9	-9.7	-3.6	.7	-2.4	-2.2	-4.7	-12.9	-15.8	-14.2	-13.6	-14.3	-12.6	-18.2	-13.7	-15.5	-22.2
-10.9	-8.0	-4.4	-4.7	-4.3	-3.1	-2.7	-2.7	-3.0	-5.2	-24.0	-26.0	-27.7	-31.2	-19.5	-8.5	-4.2	-6.3	-13.7	-21.5	-23.3	-10.2	-6.3	-8.7	-10.1	-12.1	-18.0	-23.8	-27.8	-23.8	-22.0	-25.4	-21.3	-14.6	-15.0	-18.3
-9.1	-9.1	-14.9	-13.6	-12.5	-6.9	-4.6	-4.2	-5.1	-6.0	-10.1	-19.4	-24.3	-15.1	-8.2	-2.7	-1.7	-2.0	-4.6	-16.4	-19.8	-18.9	-17.2	-10.9	-12.0	-14.1	-8.8	-10.2	-7.6	-5.3	-13.6	-11.6	-13.2	-6.1	-6.3	-11.4
-8.2	-5.3	-8.2	-11.9	-19.0	-14.5	-8.4	-5.9	-5.3	-6.4	-5.0	-4.4	-14.2	-8.4	-3.0	-4.5	-3.0	-2.4	-2.3	-5.1	-12.5	-6.0	-7.2	-7.9	-9.6	-5.7	-7.6	-9.7	-6.7	-3.9	-11.1	-7.2	-10.9	-12.3	-8.3	-8.4
-15.2	-12.1	-11.0	-11.6	-13.8	-14.3	-11.5	-6.5	-5.3	-5.2	-2.4	-5.6	-14.9	-15.3	-12.3	-9.0	-8.4	-7.6	-6.3	-3.9	-6.1	-7.7	-8.3	-7.7	-11.4	-11.1	-10.5	-9.9	-8.2	-7.1	-9.8	-8.7	-7.4	-11.9	-11.9	-11.1
-9.5	-10.8	-10.7	-12.4	-10.6	-11.7	-12.3	-11.4	-10.1	-9.4	-10.8	-9.4	-10.2	-10.6	-11.3	-12.8	-14.2	-15.0	-12.6	-11.7	-10.5	-10.9	-10.9	-12.1	-12.2	-11.4	-11.7	-12.6	-9.8	-12.0	-11.0	-9.8	-9.1	-10.5	-11.4	-9.4
-13.4	-11.9	-11.9	-11.6	-12.5	-13.8	-14.0	-14.4	-14.0	-13.4	-15.3	-14.7	-11.8	-11.1	-11.0	-12.7	-12.4	-13.3	-13.3	-13.6	-13.2	-13.4	-12.1	-12.2	-11.5	-13.6	-14.7	-14.6	-13.6	-15.2	-13.3	-11.6	-12.0	-14.2	-13.1	-14.9
-14.8	-14.0	-13.5	-13.5	-14.1	-14.8	-14.1	-13.6	-13.1	-13.5	-13.5	-14.0	-11.8	-11.5	-12.0	-12.2	-12.9	-14.7	-13.4	-12.2	-12.9	-13.2	-11.0	-8.6	-12.4	-13.6	-12.9	-11.7	-11.9	-11.4	-10.3	-9.4	-11.3	-13.3	-15.2	-14.7
-12.4	-13.0	-11.6	-8.7	-7.9	-7.0	-7.0	-7.2	-8.2	-8.8	-10.5	-10.7	-11.9	-10.8	-12.5	-10.1	-9.0	-5.6	-4.1	-3.9	-4.2	-2.5	-2.2	-2.6	-3.7	-3.9	-3.6	-4.3	-3.9	-2.8	-1.6	-.4	-.8	-1.7	-8.0	-13.1
-6.4	-7.3	-7.6	-5.0	-2.8	-2.2	-3.1	-2.2	-1.8	-1.9	-4.2	-5.9	-5.4	-4.0	-3.3	-1.3	-1.3	-1.8	-1.4	-1.3	-1.0	-1.0	-2.8	-4.2	-3.8	-3.1	-3.1	-2.4	-1.6	-.9	-.6	-.2	-1.0	-.7	-6.1	-7.1

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



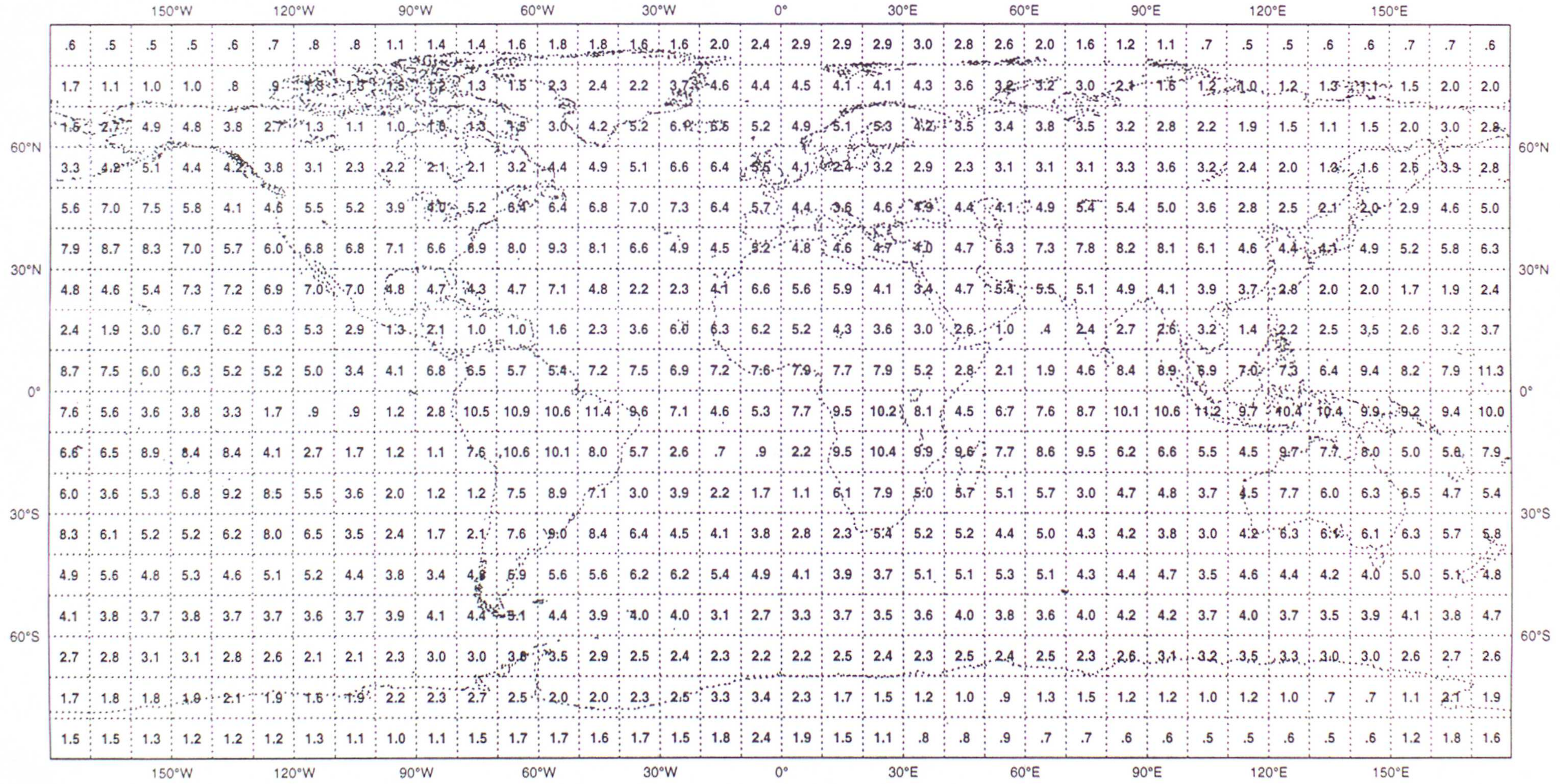
4.0	4.3	4.1	3.7	3.2	3.1	4.0	4.2	4.7	6.0	7.3	6.4	8.0	8.3	8.8	8.6	5.9	6.3	7.3	7.7	6.7	6.9	6.8	7.2	6.0	5.0	4.3	4.4	3.8	3.8	3.7	3.8	4.1	4.3	4.2	4.0
5.4	4.7	4.4	4.0	4.0	4.9	5.8	5.3	8.5	8.1	5.9	6.7	7.8	6.3	5.4	10.6	11.4	11.4	12.0	11.0	10.8	10.9	9.5	8.6	7.7	7.5	5.9	4.9	5.1	5.0	5.2	5.3	5.7	5.1	5.5	5.8
6.2	7.9	13.6	13.2	10.3	8.5	5.2	5.0	4.7	5.5	6.5	5.2	11.1	12.1	14.4	15.8	16.3	13.9	13.6	13.1	12.7	10.7	9.0	8.6	9.1	8.4	7.9	7.6	6.4	5.8	5.8	5.7	7.9	8.0	9.6	8.7
9.6	11.9	13.6	12.1	12.5	10.7	8.7	6.6	5.9	6.2	6.2	8.7	12.1	13.1	14.0	16.7	16.7	14.9	11.7	7.1	8.7	7.9	6.8	8.0	8.2	8.9	9.2	10.1	9.2	8.0	7.2	5.1	6.6	9.9	10.2	8.8
14.7	16.7	17.4	14.3	11.7	12.7	14.0	12.5	9.9	9.9	11.8	18.2	14.4	15.4	16.9	18.0	16.7	15.6	13.5	12.3	12.9	13.5	11.7	10.8	12.5	13.4	14.0	13.3	10.6	8.4	8.8	6.3	8.1	10.4	12.7	14.0
18.6	19.3	18.8	16.8	14.6	15.8	17.2	16.5	16.8	15.5	16.7	18.7	21.1	19.5	16.2	12.9	12.3	15.1	15.1	14.9	14.6	12.3	13.2	16.5	17.5	18.5	18.4	17.6	14.8	12.5	12.1	12.4	14.2	14.4	15.7	16.2
11.7	12.1	13.9	17.4	17.7	16.8	17.3	17.5	12.5	12.1	11.3	11.7	16.2	11.6	6.5	6.7	11.4	17.7	16.5	15.8	11.4	10.6	12.5	13.8	14.0	13.6	12.8	11.3	10.2	9.4	9.3	7.4	6.8	6.6	6.6	7.4
6.7	5.7	8.0	15.9	14.9	15.0	12.8	7.7	4.1	6.3	3.6	3.6	4.8	6.4	9.3	14.7	16.2	17.2	15.4	13.1	11.2	9.7	7.4	3.5	1.9	8.3	8.1	7.8	8.7	4.7	6.5	7.1	9.0	7.3	8.7	9.8
18.9	16.2	14.0	14.5	12.3	11.9	11.5	8.8	10.1	15.3	14.6	14.0	12.3	15.8	16.5	15.6	16.4	18.6	19.5	18.9	19.8	14.0	8.3	5.6	5.3	11.0	18.7	19.7	16.4	16.1	16.8	15.2	20.3	18.1	18.8	23.8
17.2	13.6	9.2	9.6	8.3	4.8	3.3	3.4	3.9	7.4	22.0	23.4	22.5	23.5	21.0	15.8	10.6	12.8	17.9	21.6	23.0	18.9	11.8	15.7	17.1	19.0	21.7	22.9	23.0	21.2	23.3	22.9	21.4	20.3	20.4	21.9
14.4	15.2	20.1	19.2	19.1	10.6	7.1	5.4	4.5	4.6	16.1	22.6	21.9	18.7	13.7	6.5	2.8	3.3	6.2	21.4	23.1	22.3	20.8	17.7	19.0	20.4	13.9	14.6	12.9	11.0	21.3	18.5	17.9	12.1	11.7	17.0
13.5	9.1	12.5	16.2	20.7	19.9	13.5	9.5	6.6	5.2	5.3	16.7	19.6	16.2	7.9	9.3	6.4	5.5	4.1	15.3	18.9	12.1	13.7	12.5	13.5	8.2	11.2	10.9	9.2	12.8	18.5	15.8	16.0	15.5	11.9	12.8
18.2	14.2	12.4	12.9	14.8	18.5	15.6	10.2	7.7	5.9	6.6	18.1	20.8	19.4	15.8	11.6	10.7	9.9	8.2	7.6	13.3	12.6	12.6	11.1	12.5	10.8	10.5	10.0	8.4	11.4	15.5	15.2	16.3	15.5	14.1	14.4
12.5	13.3	12.0	12.9	11.5	12.6	13.0	11.3	10.5	9.9	13.4	16.9	15.0	14.5	15.2	14.6	12.9	12.1	11.2	10.8	10.7	12.7	12.7	13.0	12.8	11.5	11.4	12.3	10.0	12.2	11.0	10.9	10.9	12.8	13.0	13.3
12.3	10.7	10.2	10.5	10.3	10.5	10.0	10.8	11.2	11.6	12.8	14.5	12.5	11.1	10.6	10.3	8.6	7.9	9.1	9.8	9.7	10.0	10.5	10.4	10.3	11.0	11.2	10.9	10.4	11.4	10.0	9.9	10.8	11.2	10.8	13.2
8.8	8.8	8.9	8.9	8.5	8.2	7.3	7.7	8.5	9.8	10.0	11.8	10.1	8.4	7.8	7.6	7.1	7.2	8.1	8.6	8.4	8.5	9.9	9.3	9.5	8.4	8.8	9.6	9.9	10.3	10.2	9.9	9.7	8.4	8.5	8.3
7.1	6.6	7.1	8.1	9.0	8.2	7.1	7.6	8.4	8.3	9.0	8.3	7.0	7.0	8.0	9.0	10.5	9.9	7.1	5.8	6.0	4.8	4.4	4.1	5.3	5.6	4.1	4.1	3.8	3.9	3.5	3.1	3.4	4.8	9.6	8.0
6.4	6.4	6.0	5.6	5.2	5.2	4.9	4.4	4.3	4.3	5.8	6.7	7.3	6.8	6.8	5.6	6.2	6.9	5.9	4.7	3.9	3.0	3.2	3.9	3.5	3.1	3.0	2.6	2.5	2.8	3.1	2.8	3.0	4.8	7.9	6.9

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



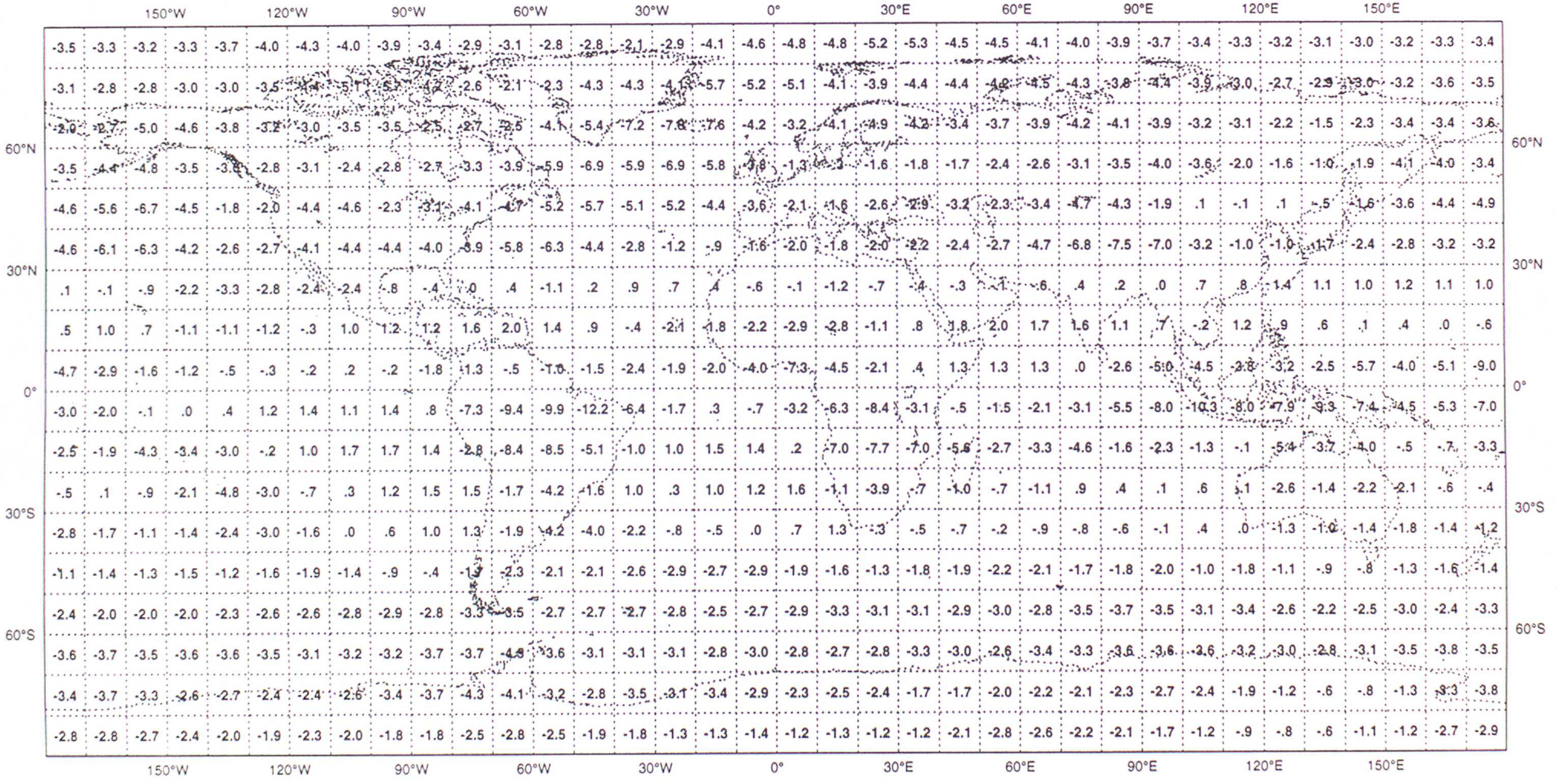
-.8	-.7	-.7	-.7	-.8	-.9	-1.1	-1.0	-1.1	-.9	-.7	-.9	-.8	-.8	-.5	-.9	-1.7	-2.2	-2.4	-2.4	-2.5	-2.5	-2.0	-1.9	-1.6	-1.5	-1.4	-1.2	-.9	-.8	-.7	-.7	-.7	-.8	-.9	-.8
-.7	-.5	-.6	-.6	-.5	-.6	-.8	-1.1	-1.4	-.8	-.4	-.3	-.6	-1.5	-1.4	-2.0	-4.0	-4.2	-4.4	-3.7	-3.4	-3.7	-3.3	-2.2	-2.4	-2.1	-1.6	-1.5	-1.1	-.6	-.6	-.8	-.9	-1.0	-1.1	-.9
-.4	-1.4	-3.3	-2.9	-1.9	-1.2	-.5	-.3	-.2	.0	-.1	-.3	-2.1	-2.7	-5.2	-6.4	-6.5	-4.2	-3.6	-3.6	-3.7	-3.5	-2.6	-2.3	-2.2	-2.2	-2.0	-1.8	-1.2	-1.0	-.5	.0	-.3	-.9	-1.0	-1.4
-3.0	-3.7	-4.5	-3.9	-3.2	-2.1	-2.0	-.7	-.7	-.6	-.8	-1.6	-4.1	-5.8	-5.4	-6.6	-6.4	-4.1	-2.1	-.8	-1.5	-1.5	-1.2	-1.6	-1.7	-2.0	-2.3	-2.3	-2.1	-.8	-.4	-.1	-.9	-2.4	-2.7	-2.8
-4.4	-5.5	-6.8	-5.2	-2.9	-2.7	-3.7	-3.6	-1.8	-2.3	-3.2	-4.1	-4.8	-6.2	-6.2	-5.9	-5.4	-4.3	-2.4	-1.4	-2.3	-3.3	-3.1	-2.7	-3.2	-3.6	-2.7	-.7	.6	-.4	-.5	-.8	-1.3	-2.8	-3.8	-4.6
-6.1	-7.7	-7.4	-5.2	-4.1	-3.9	-4.4	-4.3	-5.0	-4.8	-5.4	-7.9	-8.2	-6.2	-4.5	-3.0	-2.7	-2.2	-2.5	-3.0	-3.0	-2.9	-2.6	-2.7	-4.7	-5.5	-4.9	-4.5	-2.7	-2.3	-2.8	-3.3	-4.2	-4.6	-4.9	-4.8
-2.3	-2.1	-2.7	-4.4	-5.4	-4.9	-4.2	-3.5	-2.5	-2.4	-1.9	-1.7	-2.9	-1.8	-.9	-.9	-1.1	-1.8	-1.0	-1.3	-.6	-.6	-1.4	-2.2	-1.8	-1.2	-1.2	-1.5	-1.2	-2.1	-2.0	-1.3	-1.2	-1.1	-1.1	-1.4
-1.2	-.8	-1.3	-3.5	-3.7	-4.1	-2.8	-.8	-.2	-.9	-.3	-.4	-.6	-1.1	-2.1	-3.6	-3.0	-2.1	-1.8	-1.7	-.2	.1	-.2	-.2	-.1	.1	-1.0	-1.1	-1.6	-.6	-1.1	-1.5	-1.8	-1.4	-1.6	-1.8
-6.0	-4.3	-3.7	-3.6	-2.7	-2.3	-2.2	-1.6	-1.9	-3.3	-3.9	-2.8	-3.2	-4.3	-4.7	-3.8	-3.5	-4.7	-6.0	-4.8	-3.5	-1.3	.2	-.7	-.7	-1.7	-5.0	-6.1	-5.1	-4.9	-5.2	-4.5	-7.0	-5.3	-5.8	-9.1
-4.3	-2.9	-1.5	-1.6	-1.3	-.7	-.6	-.6	-.6	-1.5	-9.5	-10.3	-11.0	-12.6	-7.6	-3.2	-1.5	-2.2	-4.9	-7.9	-9.0	-3.9	-2.0	-3.1	-3.8	-4.7	-7.2	-9.6	-11.2	-9.0	-8.6	-10.2	-8.3	-5.7	-6.2	-7.4
-3.3	-3.1	-5.6	-5.2	-4.7	-2.1	-1.0	-.7	-.7	-.9	-3.7	-7.6	-9.4	-5.4	-2.7	-.7	-.3	-.3	-1.2	-6.3	-7.7	-7.4	-6.6	-4.0	-4.5	-5.5	-3.0	-3.5	-2.6	-1.8	-5.2	-4.0	-4.7	-1.9	-2.2	-4.2
-2.7	-1.4	-2.6	-4.0	-6.9	-5.0	-2.6	-1.5	-.9	-.9	-.4	-1.3	-5.3	-3.1	-.7	-1.2	-.6	-.4	-.3	-1.6	-4.5	-1.9	-2.4	-2.3	-2.9	-1.3	-2.0	-2.3	-1.5	-1.1	-3.8	-2.2	-3.5	-4.0	-2.5	-2.5
-5.2	-3.8	-3.1	-3.3	-4.1	-4.7	-3.5	-1.6	-1.0	-.7	-.1	-2.0	-5.5	-5.5	-4.2	-2.6	-2.1	-1.8	-1.2	-.6	-1.8	-2.2	-2.3	-1.9	-3.0	-2.8	-2.6	-2.2	-1.6	-1.7	-3.1	-2.7	-2.3	-3.6	-3.4	-3.2
-2.5	-3.1	-3.0	-3.5	-2.8	-3.2	-3.4	-3.0	-2.5	-2.2	-2.8	-2.8	-3.1	-3.1	-3.7	-4.0	-3.9	-3.9	-2.9	-2.8	-2.6	-2.9	-3.0	-3.4	-3.4	-3.0	-3.0	-3.4	-2.3	-3.1	-2.7	-2.3	-2.2	-2.7	-3.0	-2.5
-3.3	-2.9	-3.0	-2.8	-3.0	-3.3	-3.2	-3.3	-3.3	-3.2	-3.8	-3.9	-3.1	-2.9	-2.8	-2.8	-2.4	-2.7	-2.7	-3.0	-2.8	-2.9	-2.7	-2.7	-2.6	-3.2	-3.5	-3.5	-3.2	-3.7	-3.1	-2.6	-2.8	-3.4	-3.0	-3.8
-2.9	-2.8	-2.7	-2.7	-2.8	-2.9	-2.5	-2.3	-2.3	-2.7	-2.7	-3.2	-2.6	-2.3	-2.3	-2.3	-2.4	-2.8	-2.4	-2.1	-2.2	-2.3	-2.0	-1.5	-2.3	-2.5	-2.6	-2.6	-2.8	-2.7	-2.2	-1.9	-2.2	-2.5	-2.9	-2.8
-2.0	-2.1	-1.8	-1.2	-1.1	-1.1	-1.1	-1.2	-1.7	-1.8	-2.2	-2.1	-1.9	-1.7	-2.2	-1.9	-2.0	-1.6	-1.1	-.9	-.8	-.4	-.3	-.4	-.7	-.8	-.8	-1.0	-.8	-.6	-.2	.1	.1	-.1	-1.3	-2.1
-.7	-.8	-.7	-.4	-.1	-.1	-.4	-.2	-.1	-.1	-.5	-.7	-.6	-.3	-.2	.0	-.1	-.3	-.2	-.2	-.2	-.1	-.4	-.6	-.5	-.4	-.4	-.2	-.1	.1	.2	.3	.2	.1	-.8	-.8

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



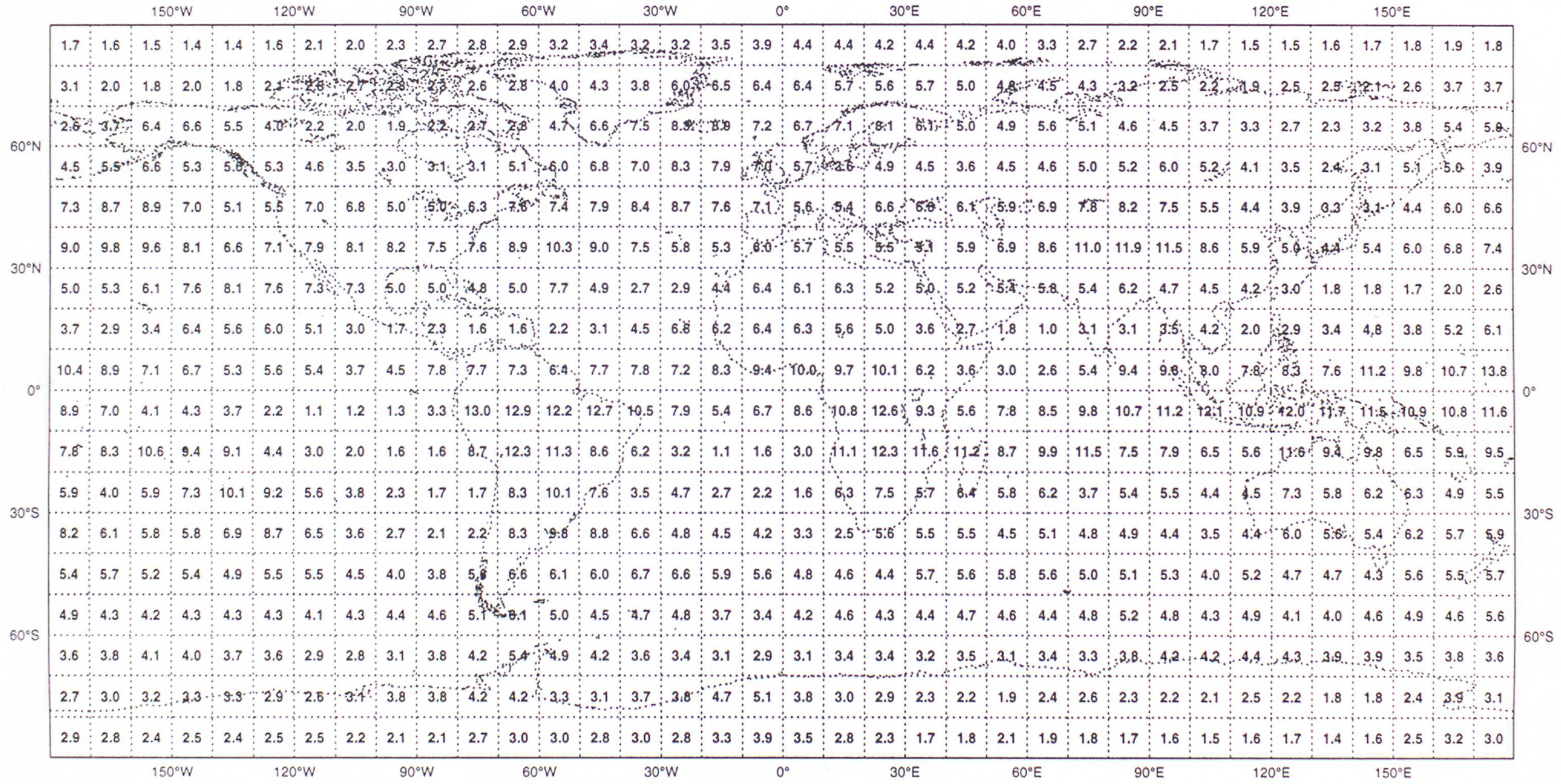
.6	.5	.5	.5	.6	.7	.8	.8	1.1	1.4	1.4	1.6	1.8	1.8	1.6	1.6	2.0	2.4	2.9	2.9	2.9	3.0	2.8	2.6	2.0	1.6	1.2	1.1	.7	.5	.5	.6	.6	.7	.7	.6
1.7	1.1	1.0	1.0	.8	.9	1.3	1.3	1.3	1.2	1.3	1.5	2.3	2.4	2.2	3.7	4.6	4.4	4.5	4.1	4.1	4.3	3.6	3.2	3.2	3.0	2.1	1.6	1.2	1.0	1.2	1.3	1.1	1.5	2.0	2.0
1.5	2.7	4.9	4.8	3.8	2.7	1.3	1.1	1.0	1.0	1.3	1.5	3.0	4.2	5.2	6.1	5.5	5.2	4.9	5.1	5.3	4.2	3.5	3.4	3.8	3.5	3.2	2.8	2.2	1.9	1.5	1.1	1.5	2.0	3.0	2.8
3.3	4.2	5.1	4.4	4.2	3.8	3.1	2.3	2.2	2.1	2.1	3.2	4.4	4.9	5.1	6.6	6.4	5.5	4.1	2.4	3.2	2.9	2.3	3.1	3.1	3.1	3.3	3.6	3.2	2.4	2.0	1.3	1.6	2.6	3.9	2.8
5.6	7.0	7.5	5.8	4.1	4.6	5.5	5.2	3.9	4.0	5.2	6.4	6.4	6.8	7.0	7.3	6.4	5.7	4.4	3.6	4.6	4.9	4.4	4.1	4.9	5.4	5.4	5.0	3.6	2.8	2.5	2.1	2.0	2.9	4.6	5.0
7.9	8.7	8.3	7.0	5.7	6.0	6.8	6.8	7.1	6.6	6.9	8.0	9.3	8.1	6.6	4.9	4.5	5.2	4.8	4.6	4.7	4.0	4.7	6.3	7.3	7.8	8.2	8.1	6.1	4.6	4.4	4.1	4.9	5.2	5.8	6.3
4.8	4.6	5.4	7.3	7.2	6.9	7.0	7.0	4.8	4.7	4.3	4.7	7.1	4.8	2.2	2.3	4.1	6.6	5.6	5.9	4.1	3.4	4.7	5.4	5.5	5.1	4.9	4.1	3.9	3.7	2.8	2.0	2.0	1.7	1.9	2.4
2.4	1.9	3.0	6.7	6.2	6.3	5.3	2.9	1.3	2.1	1.0	1.0	1.6	2.3	3.6	6.0	6.3	6.2	5.2	4.3	3.6	3.0	2.6	1.0	.4	2.4	2.7	2.6	3.2	1.4	2.2	2.5	3.5	2.6	3.2	3.7
8.7	7.5	6.0	6.3	5.2	5.2	5.0	3.4	4.1	6.8	6.5	5.7	5.4	7.2	7.5	6.9	7.2	7.6	7.9	7.7	7.9	5.2	2.8	2.1	1.9	4.6	8.4	8.9	6.9	7.0	7.3	6.4	9.4	8.2	7.9	11.3
7.6	5.6	3.6	3.8	3.3	1.7	.9	.9	1.2	2.8	10.5	10.9	10.6	11.4	9.6	7.1	4.6	5.3	7.7	9.5	10.2	8.1	4.5	6.7	7.6	8.7	10.1	10.6	11.2	9.7	10.4	10.4	9.9	9.2	9.4	10.0
6.6	6.5	8.9	8.4	8.4	4.1	2.7	1.7	1.2	1.1	7.6	10.6	10.1	8.0	5.7	2.6	.7	.9	2.2	9.5	10.4	9.9	9.6	7.7	8.6	9.5	6.2	6.6	5.5	4.5	9.7	7.7	8.0	5.0	5.8	7.9
6.0	3.6	5.3	6.8	9.2	8.5	5.5	3.6	2.0	1.2	1.2	7.5	8.9	7.1	3.0	3.9	2.2	1.7	1.1	6.1	7.9	5.0	5.7	5.1	5.7	3.0	4.7	4.8	3.7	4.5	7.7	6.0	6.3	6.5	4.7	5.4
8.3	6.1	5.2	5.2	6.2	8.0	6.5	3.5	2.4	1.7	2.1	7.6	9.0	8.4	6.4	4.5	4.1	3.8	2.8	2.3	5.4	5.2	5.2	4.4	5.0	4.3	4.2	3.8	3.0	4.2	6.3	6.1	6.1	6.3	5.7	5.8
4.9	5.6	4.8	5.3	4.6	5.1	5.2	4.4	3.8	3.4	4.8	5.9	5.6	5.6	6.2	6.2	5.4	4.9	4.1	3.9	3.7	5.1	5.1	5.3	5.1	4.3	4.4	4.7	3.5	4.6	4.4	4.2	4.0	5.0	5.1	4.8
4.1	3.8	3.7	3.8	3.7	3.7	3.6	3.7	3.9	4.1	4.4	5.1	4.4	3.9	4.0	4.0	3.1	2.7	3.3	3.7	3.5	3.6	4.0	3.8	3.6	4.0	4.2	4.2	3.7	4.0	3.7	3.5	3.9	4.1	3.8	4.7
2.7	2.8	3.1	3.1	2.8	2.6	2.1	2.1	2.3	3.0	3.0	3.6	3.5	2.9	2.5	2.4	2.3	2.2	2.2	2.5	2.4	2.3	2.5	2.4	2.5	2.3	2.6	3.1	3.2	3.5	3.3	3.0	3.0	2.6	2.7	2.6
1.7	1.8	1.8	1.8	2.1	1.9	1.6	1.9	2.2	2.3	2.7	2.5	2.0	2.0	2.3	2.5	3.3	3.4	2.3	1.7	1.5	1.2	1.0	.9	1.3	1.5	1.2	1.2	1.0	1.2	1.0	.7	.7	1.1	2.1	1.9
1.5	1.5	1.3	1.2	1.2	1.2	1.3	1.1	1.0	1.1	1.5	1.7	1.7	1.6	1.7	1.5	1.8	2.4	1.9	1.5	1.1	.8	.8	.9	.7	.7	.6	.6	.5	.5	.6	.5	.6	1.2	1.8	1.6

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



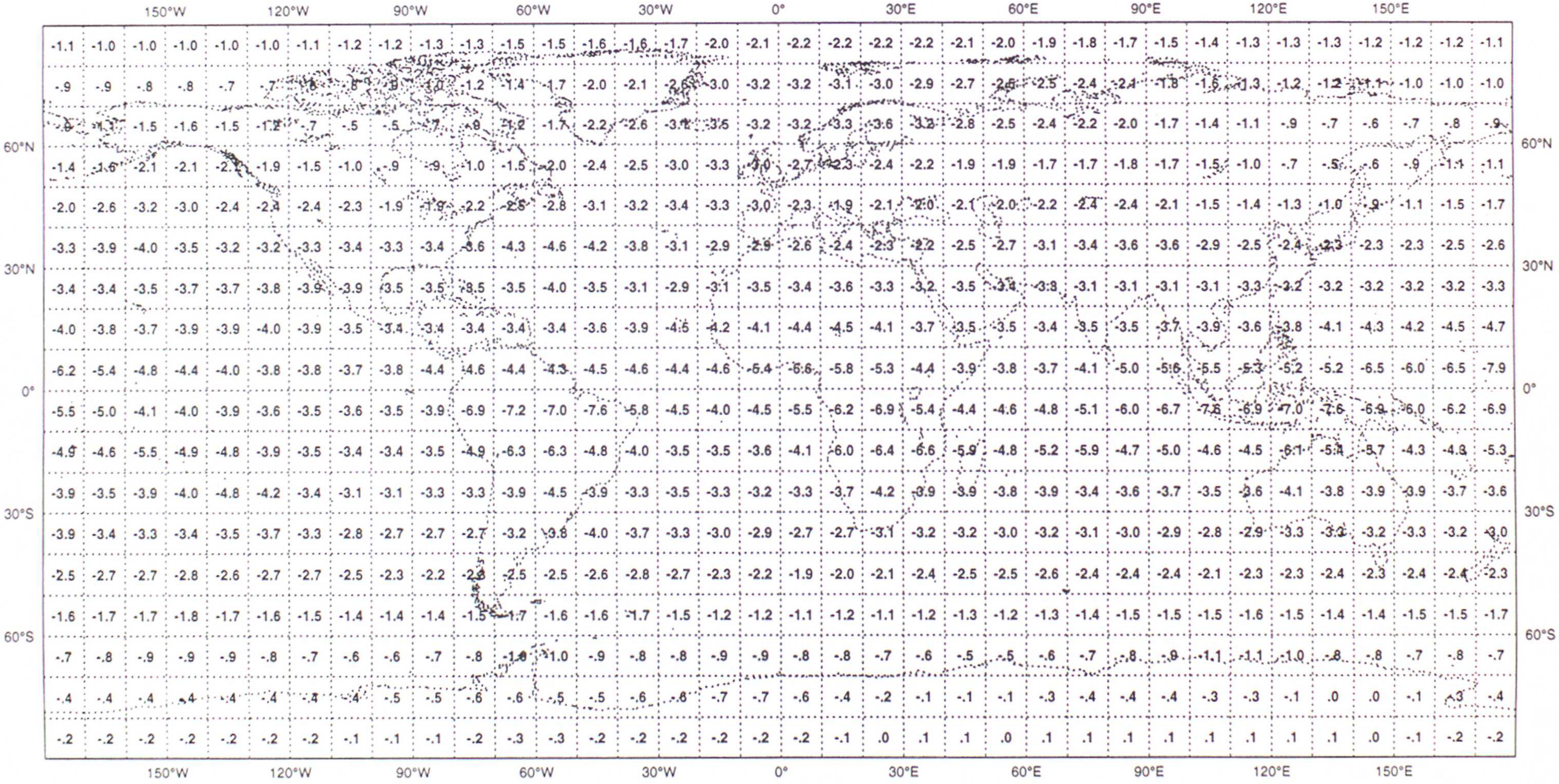
-3.5	-3.3	-3.2	-3.3	-3.7	-4.0	-4.3	-4.0	-3.9	-3.4	-2.9	-3.1	-2.8	-2.8	-2.1	-2.9	-4.1	-4.6	-4.8	-4.8	-5.2	-5.3	-4.5	-4.5	-4.1	-4.0	-3.9	-3.7	-3.4	-3.3	-3.2	-3.1	-3.0	-3.2	-3.3	-3.4
-3.1	-2.8	-2.8	-3.0	-3.0	-3.5	-4.4	-5.1	-5.7	-4.2	-2.6	-2.1	-2.3	-4.3	-4.3	-4.1	-5.7	-5.2	-5.1	-4.1	-3.9	-4.4	-4.4	-4.2	-4.5	-4.3	-3.8	-4.4	-3.9	-3.0	-2.7	-2.9	-3.0	-3.2	-3.6	-3.5
-2.0	-2.7	-5.0	-4.6	-3.8	-3.2	-3.0	-3.5	-3.5	-2.5	-2.7	-2.5	-4.1	-5.4	-7.2	-7.8	-7.6	-4.2	-3.2	-4.1	-4.9	-4.2	-3.4	-3.7	-3.9	-4.2	-4.1	-3.9	-3.2	-3.1	-2.2	-1.5	-2.3	-3.4	-3.4	-3.6
-3.5	-4.4	-4.8	-3.5	-3.8	-2.8	-3.1	-2.4	-2.8	-2.7	-3.3	-3.9	-5.9	-6.9	-5.9	-6.9	-5.8	-3.8	-1.3	-.3	-1.6	-1.8	-1.7	-2.4	-2.6	-3.1	-3.5	-4.0	-3.6	-2.0	-1.6	-1.0	-1.9	-4.1	-4.0	-3.4
-4.6	-5.6	-6.7	-4.5	-1.8	-2.0	-4.4	-4.6	-2.3	-3.1	-4.1	-4.7	-5.2	-5.7	-5.1	-5.2	-4.4	-3.6	-2.1	-1.6	-2.6	-2.9	-3.2	-2.3	-3.4	-4.7	-4.3	-1.9	.1	-.1	.1	-.5	-1.6	-3.6	-4.4	-4.9
-4.6	-6.1	-6.3	-4.2	-2.6	-2.7	-4.1	-4.4	-4.4	-4.0	-3.9	-5.8	-6.3	-4.4	-2.8	-1.2	-.9	-1.6	-2.0	-1.8	-2.0	-2.2	-2.4	-2.7	-4.7	-6.8	-7.5	-7.0	-3.2	-1.0	-1.0	-1.7	-2.4	-2.8	-3.2	-3.2
.1	-.1	-.9	-2.2	-3.3	-2.8	-2.4	-2.4	-.8	-.4	.0	.4	-1.1	.2	.9	.7	.4	-.6	-.1	-1.2	-.7	-.4	-.3	-.1	-.6	.4	.2	.0	.7	.8	1.4	1.1	1.0	1.2	1.1	1.0
.5	1.0	.7	-1.1	-1.1	-1.2	-.3	1.0	1.2	1.2	1.6	2.0	1.4	.9	-.4	-2.1	-1.8	-2.2	-2.9	-2.8	-1.1	.8	1.8	2.0	1.7	1.6	1.1	.7	-.2	1.2	.9	.6	.1	.4	.0	-.6
-4.7	-2.9	-1.6	-1.2	-.5	-.3	-.2	.2	-.2	-1.8	-1.3	-.5	-1.0	-1.5	-2.4	-1.9	-2.0	-4.0	-7.3	-4.5	-2.1	.4	1.3	1.3	1.3	.0	-2.6	-5.0	-4.5	-3.8	-3.2	-2.5	-5.7	-4.0	-5.1	-9.0
-3.0	-2.0	-.1	.0	.4	1.2	1.4	1.1	1.4	.8	-7.3	-9.4	-9.9	-12.2	-6.4	-1.7	.3	-.7	-3.2	-6.3	-8.4	-3.1	-.5	-1.5	-2.1	-3.1	-5.5	-8.0	-10.3	-8.0	-7.9	-9.3	-7.4	-4.5	-5.3	-7.0
-2.5	-1.9	-4.3	-3.4	-3.0	-.2	1.0	1.7	1.7	1.4	-2.8	-8.4	-8.5	-5.1	-1.0	1.0	1.5	1.4	.2	-7.0	-7.7	-7.0	-5.6	-2.7	-3.3	-4.6	-1.6	-2.3	-1.3	-.1	-5.4	-3.7	-4.0	-.5	-.7	-3.3
-.5	.1	-.9	-2.1	-4.8	-3.0	-.7	.3	1.2	1.5	1.5	-1.7	-4.2	-1.6	1.0	.3	1.0	1.2	1.6	-1.1	-3.9	-.7	-1.0	-.7	-1.1	.9	.4	.1	.6	.1	-2.6	-1.4	-2.2	-2.1	-.6	-.4
-2.8	-1.7	-1.1	-1.4	-2.4	-3.0	-1.6	.0	.6	1.0	1.3	-1.9	-4.2	-4.0	-2.2	-.8	-.5	.0	.7	1.3	-.3	-.5	-.7	-.2	-.9	-.8	-.6	-.1	.4	.0	-1.3	-1.0	-1.4	-1.8	-1.4	-1.2
-1.1	-1.4	-1.3	-1.5	-1.2	-1.6	-1.9	-1.4	-.9	-.4	-1.3	-2.3	-2.1	-2.1	-2.6	-2.9	-2.7	-2.9	-1.9	-1.6	-1.3	-1.8	-1.9	-2.2	-2.1	-1.7	-1.8	-2.0	-1.0	-1.8	-1.1	-.9	-.8	-1.3	-1.6	-1.4
-2.4	-2.0	-2.0	-2.0	-2.3	-2.6	-2.6	-2.8	-2.9	-2.8	-3.3	-3.5	-2.7	-2.7	-2.7	-2.8	-2.5	-2.7	-2.9	-3.3	-3.1	-3.1	-2.9	-3.0	-2.8	-3.5	-3.7	-3.5	-3.1	-3.4	-2.6	-2.2	-2.5	-3.0	-2.4	-3.3
-3.6	-3.7	-3.5	-3.6	-3.6	-3.5	-3.1	-3.2	-3.2	-3.7	-3.7	-4.8	-3.6	-3.1	-3.1	-3.1	-2.8	-3.0	-2.8	-2.7	-2.8	-3.3	-3.0	-2.6	-3.4	-3.3	-3.6	-3.6	-3.6	-3.2	-3.0	-2.8	-3.1	-3.5	-3.8	-3.5
-3.4	-3.7	-3.3	-2.6	-2.7	-2.4	-2.4	-2.6	-3.4	-3.7	-4.3	-4.1	-3.2	-2.8	-3.5	-3.1	-3.4	-2.9	-2.3	-2.5	-2.4	-1.7	-1.7	-2.0	-2.2	-2.1	-2.3	-2.7	-2.4	-1.9	-1.2	-.6	-.8	-1.3	-3.3	-3.8
-2.8	-2.8	-2.7	-2.4	-2.0	-1.9	-2.3	-2.0	-1.8	-1.8	-2.5	-2.8	-2.5	-1.9	-1.8	-1.3	-1.3	-1.4	-1.2	-1.3	-1.2	-1.2	-2.1	-2.8	-2.6	-2.2	-2.1	-1.7	-1.2	-.9	-.8	-.6	-1.1	-1.2	-2.7	-2.9

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



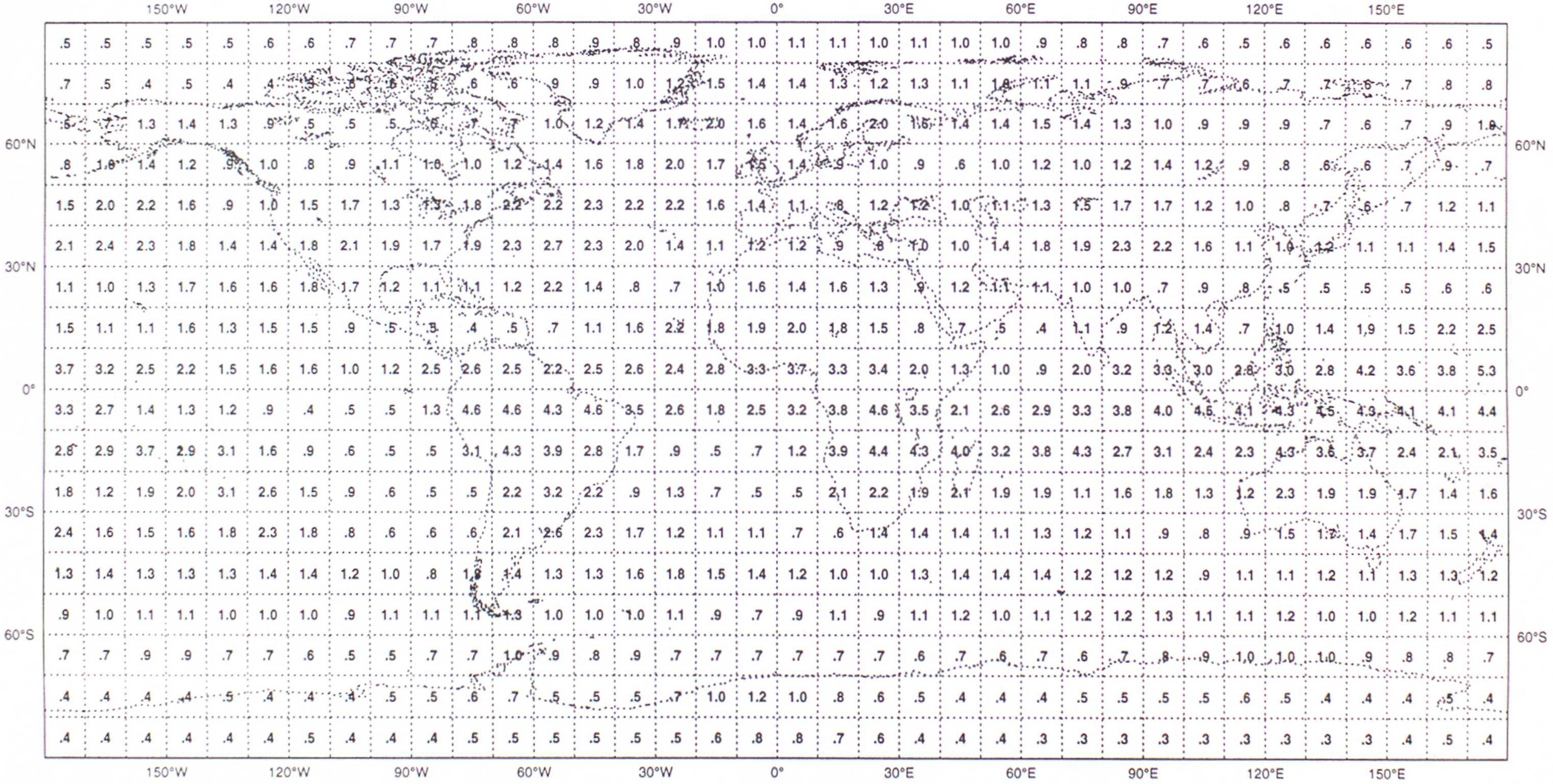
1.7	1.6	1.5	1.4	1.4	1.6	2.1	2.0	2.3	2.7	2.8	2.9	3.2	3.4	3.2	3.2	3.5	3.9	4.4	4.4	4.2	4.4	4.2	4.0	3.3	2.7	2.2	2.1	1.7	1.5	1.5	1.6	1.7	1.8	1.9	1.8
3.1	2.0	1.8	2.0	1.8	2.1	2.8	2.7	2.8	2.3	2.6	2.8	4.0	4.3	3.8	6.0	6.5	6.4	6.4	5.7	5.6	5.7	5.0	4.8	4.5	4.3	3.2	2.5	2.2	1.9	2.5	2.5	2.1	2.6	3.7	3.7
2.6	3.7	6.4	6.6	5.5	4.0	2.2	2.0	1.9	2.2	2.7	2.8	4.7	6.6	7.5	8.3	8.9	7.2	6.7	7.1	8.1	6.1	5.0	4.9	5.6	5.1	4.6	4.5	3.7	3.3	2.7	2.3	3.2	3.8	5.4	5.8
4.5	5.5	6.6	5.3	5.8	5.3	4.6	3.5	3.0	3.1	3.1	5.1	6.0	6.8	7.0	8.3	7.9	7.0	5.7	2.6	4.9	4.5	3.6	4.5	4.6	5.0	5.2	6.0	5.2	4.1	3.5	2.4	3.1	5.1	5.0	3.9
7.3	8.7	8.9	7.0	5.1	5.5	7.0	6.8	5.0	5.0	6.3	7.6	7.4	7.9	8.4	8.7	7.6	7.1	5.6	5.4	6.6	6.8	6.1	5.9	6.9	7.8	8.2	7.5	5.5	4.4	3.9	3.3	3.1	4.4	6.0	6.6
9.0	9.8	9.6	8.1	6.6	7.1	7.9	8.1	8.2	7.5	7.6	8.9	10.3	9.0	7.5	5.8	5.3	6.0	5.7	5.5	5.5	5.1	5.9	6.9	8.6	11.0	11.9	11.5	8.6	5.9	5.0	4.4	5.4	6.0	6.8	7.4
5.0	5.3	6.1	7.6	8.1	7.6	7.3	7.3	5.0	5.0	4.8	5.0	7.7	4.9	2.7	2.9	4.4	6.4	6.1	6.3	5.2	5.0	5.2	5.4	5.8	5.4	6.2	4.7	4.5	4.2	3.0	1.8	1.8	1.7	2.0	2.6
3.7	2.9	3.4	6.4	5.6	6.0	5.1	3.0	1.7	2.3	1.6	1.6	2.2	3.1	4.5	6.8	6.2	6.4	6.3	5.6	5.0	3.6	2.7	1.8	1.0	3.1	3.1	3.5	4.2	2.0	2.9	3.4	4.8	3.8	5.2	6.1
10.4	8.9	7.1	6.7	5.3	5.6	5.4	3.7	4.5	7.8	7.7	7.3	6.4	7.7	7.8	7.2	8.3	9.4	10.0	9.7	10.1	6.2	3.6	3.0	2.6	5.4	9.4	9.8	8.0	7.8	8.3	7.6	11.2	9.8	10.7	13.8
8.9	7.0	4.1	4.3	3.7	2.2	1.1	1.2	1.3	3.3	13.0	12.9	12.2	12.7	10.5	7.9	5.4	6.7	8.6	10.8	12.6	9.3	5.6	7.8	8.5	9.8	10.7	11.2	12.1	10.9	12.0	11.7	11.5	10.9	10.8	11.6
7.8	8.3	10.6	9.4	9.1	4.4	3.0	2.0	1.6	1.6	8.7	12.3	11.3	8.6	6.2	3.2	1.1	1.6	3.0	11.1	12.3	11.6	11.2	8.7	9.9	11.5	7.5	7.9	6.5	5.6	11.6	9.4	9.8	6.5	5.9	9.5
5.9	4.0	5.9	7.3	10.1	9.2	5.6	3.8	2.3	1.7	1.7	8.3	10.1	7.6	3.5	4.7	2.7	2.2	1.6	6.3	7.5	5.7	6.4	5.8	6.2	3.7	5.4	5.5	4.4	4.5	7.3	5.8	6.2	6.3	4.9	5.5
8.2	6.1	5.8	5.8	6.9	8.7	6.5	3.6	2.7	2.1	2.2	8.3	9.8	8.8	6.6	4.8	4.5	4.2	3.3	2.5	5.6	5.5	5.5	4.5	5.1	4.8	4.9	4.4	3.5	4.4	6.0	5.6	5.4	6.2	5.7	5.9
5.4	5.7	5.2	5.4	4.9	5.5	5.5	4.5	4.0	3.8	5.6	6.6	6.1	6.0	6.7	6.6	5.9	5.6	4.8	4.6	4.4	5.7	5.6	5.8	5.6	5.0	5.1	5.3	4.0	5.2	4.7	4.7	4.3	5.6	5.5	5.7
4.9	4.3	4.2	4.3	4.3	4.3	4.1	4.3	4.4	4.6	5.1	6.1	5.0	4.5	4.7	4.8	3.7	3.4	4.2	4.6	4.3	4.4	4.7	4.6	4.4	4.8	5.2	4.8	4.3	4.9	4.1	4.0	4.6	4.9	4.6	5.6
3.6	3.8	4.1	4.0	3.7	3.6	2.9	2.8	3.1	3.8	4.2	5.4	4.9	4.2	3.6	3.4	3.1	2.9	3.1	3.4	3.4	3.2	3.5	3.1	3.4	3.3	3.8	4.2	4.2	4.4	4.3	3.9	3.9	3.5	3.8	3.6
2.7	3.0	3.2	3.3	3.3	2.9	2.6	3.1	3.8	3.8	4.2	4.2	3.3	3.1	3.7	3.8	4.7	5.1	3.8	3.0	2.9	2.3	2.2	1.9	2.4	2.6	2.3	2.2	2.1	2.5	2.2	1.8	1.8	2.4	3.9	3.1
2.9	2.8	2.4	2.5	2.4	2.5	2.5	2.2	2.1	2.1	2.7	3.0	3.0	2.8	3.0	2.8	3.3	3.9	3.5	2.8	2.3	1.7	1.8	2.1	1.9	1.8	1.7	1.6	1.5	1.6	1.7	1.4	1.6	2.5	3.2	3.0

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



-1.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.1	-1.2	-1.2	-1.3	-1.3	-1.5	-1.5	-1.6	-1.6	-1.7	-2.0	-2.1	-2.2	-2.2	-2.2	-2.2	-2.1	-2.0	-1.9	-1.8	-1.7	-1.5	-1.4	-1.3	-1.3	-1.3	-1.2	-1.2	-1.2	-1.1
-.9	-.9	-.8	-.8	-.7	-.7	-.8	-.8	-.9	-1.0	-1.2	-1.4	-1.7	-2.0	-2.1	-2.6	-3.0	-3.2	-3.2	-3.1	-3.0	-2.9	-2.7	-2.6	-2.5	-2.4	-2.4	-1.8	-1.6	-1.3	-1.2	-1.2	-1.1	-1.0	-1.0	-1.0
-.8	-1.1	-1.5	-1.6	-1.5	-1.2	-.7	-.5	-.5	-.7	-.8	-1.2	-1.7	-2.2	-2.6	-3.1	-3.5	-3.2	-3.2	-3.3	-3.6	-3.2	-2.8	-2.5	-2.4	-2.2	-2.0	-1.7	-1.4	-1.1	-.9	-.7	-.6	-.7	-.8	-.9
-1.4	-1.6	-2.1	-2.1	-2.2	-1.9	-1.5	-1.0	-.9	-.9	-1.0	-1.5	-2.0	-2.4	-2.5	-3.0	-3.3	-3.0	-2.7	-2.3	-2.4	-2.2	-1.9	-1.9	-1.7	-1.7	-1.8	-1.7	-1.5	-1.0	-.7	-.5	-.6	-.9	-1.1	-1.1
-2.0	-2.6	-3.2	-3.0	-2.4	-2.4	-2.4	-2.3	-1.9	-1.9	-2.2	-2.5	-2.8	-3.1	-3.2	-3.4	-3.3	-3.0	-2.3	-1.9	-2.1	-2.0	-2.1	-2.0	-2.2	-2.4	-2.4	-2.1	-1.5	-1.4	-1.3	-1.0	-.9	-1.1	-1.5	-1.7
-3.3	-3.9	-4.0	-3.5	-3.2	-3.2	-3.3	-3.4	-3.3	-3.4	-3.6	-4.3	-4.6	-4.2	-3.8	-3.1	-2.9	-2.9	-2.6	-2.4	-2.3	-2.2	-2.5	-2.7	-3.1	-3.4	-3.6	-3.6	-2.9	-2.5	-2.4	-2.3	-2.3	-2.3	-2.5	-2.6
-3.4	-3.4	-3.5	-3.7	-3.7	-3.8	-3.9	-3.9	-3.5	-3.5	-3.5	-3.5	-4.0	-3.5	-3.1	-2.9	-3.1	-3.5	-3.4	-3.6	-3.3	-3.2	-3.5	-3.4	-3.3	-3.1	-3.1	-3.1	-3.1	-3.3	-3.2	-3.2	-3.2	-3.2	-3.2	-3.3
-4.0	-3.8	-3.7	-3.9	-3.9	-4.0	-3.9	-3.5	-3.4	-3.4	-3.4	-3.4	-3.4	-3.6	-3.9	-4.5	-4.2	-4.1	-4.4	-4.5	-4.1	-3.7	-3.5	-3.5	-3.4	-3.5	-3.5	-3.7	-3.9	-3.6	-3.8	-4.1	-4.3	-4.2	-4.5	-4.7
-6.2	-5.4	-4.8	-4.4	-4.0	-3.8	-3.8	-3.7	-3.8	-4.4	-4.6	-4.4	-4.3	-4.5	-4.6	-4.4	-4.6	-5.4	-6.6	-5.8	-5.3	-4.4	-3.9	-3.8	-3.7	-4.1	-5.0	-5.6	-5.5	-5.3	-5.2	-5.2	-6.5	-6.0	-6.5	-7.9
-5.5	-5.0	-4.1	-4.0	-3.9	-3.6	-3.5	-3.6	-3.5	-3.9	-6.9	-7.2	-7.0	-7.6	-5.8	-4.5	-4.0	-4.5	-5.5	-6.2	-6.9	-5.4	-4.4	-4.6	-4.8	-5.1	-6.0	-6.7	-7.6	-6.9	-7.0	-7.6	-6.9	-6.0	-6.2	-6.9
-4.9	-4.6	-5.5	-4.9	-4.8	-3.9	-3.5	-3.4	-3.4	-3.5	-4.9	-6.3	-6.3	-4.8	-4.0	-3.5	-3.5	-3.6	-4.1	-6.0	-6.4	-6.6	-5.9	-4.8	-5.2	-5.9	-4.7	-5.0	-4.6	-4.5	-6.1	-5.4	-5.7	-4.3	-4.3	-5.3
-3.9	-3.5	-3.9	-4.0	-4.8	-4.2	-3.4	-3.1	-3.1	-3.3	-3.3	-3.9	-4.5	-3.9	-3.3	-3.5	-3.3	-3.2	-3.3	-3.7	-4.2	-3.9	-3.9	-3.8	-3.9	-3.4	-3.6	-3.7	-3.5	-3.6	-4.1	-3.8	-3.9	-3.9	-3.7	-3.6
-3.9	-3.4	-3.3	-3.4	-3.5	-3.7	-3.3	-2.8	-2.7	-2.7	-2.7	-3.2	-3.8	-4.0	-3.7	-3.3	-3.0	-2.9	-2.7	-2.7	-3.1	-3.2	-3.2	-3.0	-3.2	-3.1	-3.0	-2.9	-2.8	-2.9	-3.3	-3.3	-3.2	-3.3	-3.2	-3.0
-2.5	-2.7	-2.7	-2.8	-2.6	-2.7	-2.7	-2.5	-2.3	-2.2	-2.3	-2.5	-2.5	-2.6	-2.8	-2.7	-2.3	-2.2	-1.9	-2.0	-2.1	-2.4	-2.5	-2.5	-2.6	-2.4	-2.4	-2.4	-2.1	-2.3	-2.3	-2.4	-2.3	-2.4	-2.4	-2.3
-1.6	-1.7	-1.7	-1.8	-1.7	-1.6	-1.5	-1.4	-1.4	-1.4	-1.5	-1.7	-1.6	-1.6	-1.7	-1.5	-1.2	-1.2	-1.1	-1.2	-1.1	-1.2	-1.3	-1.2	-1.3	-1.4	-1.5	-1.5	-1.5	-1.6	-1.5	-1.4	-1.4	-1.5	-1.5	-1.7
-.7	-.8	-.9	-.9	-.9	-.8	-.7	-.6	-.6	-.7	-.8	-1.0	-1.0	-.9	-.8	-.8	-.9	-.9	-.8	-.8	-.7	-.6	-.5	-.5	-.6	-.7	-.8	-.9	-1.1	-1.1	-1.0	-.8	-.8	-.7	-.8	-.7
-.4	-.4	-.4	-.4	-.4	-.4	-.4	-.4	-.5	-.5	-.6	-.6	-.5	-.5	-.6	-.8	-.7	-.7	-.6	-.4	-.2	-.1	-.1	-.1	-.3	-.4	-.4	-.4	-.3	-.3	-.1	.0	.0	-.1	-.3	-.4
-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.1	-.1	-.1	-.2	-.3	-.3	-.2	-.2	-.2	-.2	-.2	-.2	-.1	.0	.1	.1	.0	.1	.1	.1	.1	.1	.1	.1	.1	.0	-.1	-.2	-.2

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



.5	.5	.5	.5	.5	.6	.6	.7	.7	.7	.8	.8	.8	.9	.8	.9	1.0	1.0	1.1	1.1	1.0	1.1	1.0	1.0	.9	.8	.8	.7	.6	.5	.6	.6	.6	.6	.6	.5
.7	.5	.4	.5	.4	.4	.5	.5	.6	.5	.6	.6	.9	.9	1.0	1.2	1.5	1.4	1.4	1.3	1.2	1.3	1.1	1.8	1.1	1.1	.9	.7	.7	.6	.7	.7	.6	.7	.8	.8
.5	.7	1.3	1.4	1.3	.9	.5	.5	.5	.6	.7	.7	1.0	1.2	1.4	1.7	2.0	1.6	1.4	1.6	2.0	1.6	1.4	1.4	1.5	1.4	1.3	1.0	.9	.9	.9	.7	.6	.7	.9	1.8
.8	1.8	1.4	1.2	.9	1.0	.8	.9	1.1	1.0	1.0	1.2	1.4	1.6	1.8	2.0	1.7	1.5	1.4	.9	1.0	.9	.6	1.0	1.2	1.0	1.2	1.4	1.2	.9	.8	.6	.6	.7	.9	.7
1.5	2.0	2.2	1.6	.9	1.0	1.5	1.7	1.3	1.3	1.8	2.2	2.2	2.3	2.2	2.2	1.6	1.4	1.1	.8	1.2	1.2	1.0	1.1	1.3	1.5	1.7	1.7	1.2	1.0	.8	.7	.6	.7	1.2	1.1
2.1	2.4	2.3	1.8	1.4	1.4	1.8	2.1	1.9	1.7	1.9	2.3	2.7	2.3	2.0	1.4	1.1	1.2	1.2	.9	.8	1.0	1.0	1.4	1.8	1.9	2.3	2.2	1.6	1.1	1.0	1.2	1.1	1.1	1.4	1.5
1.1	1.0	1.3	1.7	1.6	1.6	1.8	1.7	1.2	1.1	1.1	1.2	2.2	1.4	.8	.7	1.0	1.6	1.4	1.6	1.3	.9	1.2	1.1	1.1	1.0	1.0	.7	.9	.8	.5	.5	.5	.5	.6	.6
1.5	1.1	1.1	1.6	1.3	1.5	1.5	.9	.5	.3	.4	.5	.7	1.1	1.6	2.2	1.8	1.9	2.0	1.8	1.5	.8	.7	.5	.4	1.1	.9	1.2	1.4	.7	1.0	1.4	1.9	1.5	2.2	2.5
3.7	3.2	2.5	2.2	1.5	1.6	1.6	1.0	1.2	2.5	2.6	2.5	2.2	2.5	2.6	2.4	2.8	3.3	3.7	3.3	3.4	2.0	1.3	1.0	.9	2.0	3.2	3.3	3.0	2.8	3.0	2.8	4.2	3.6	3.8	5.3
3.3	2.7	1.4	1.3	1.2	.9	.4	.5	.5	1.3	4.6	4.6	4.3	4.6	3.5	2.6	1.8	2.5	3.2	3.8	4.6	3.5	2.1	2.6	2.9	3.3	3.8	4.0	4.5	4.1	4.3	4.5	4.3	4.1	4.1	4.4
2.8	2.9	3.7	2.9	3.1	1.6	.9	.6	.5	.5	3.1	4.3	3.9	2.8	1.7	.9	.5	.7	1.2	3.9	4.4	4.3	4.0	3.2	3.8	4.3	2.7	3.1	2.4	2.3	4.3	3.6	3.7	2.4	2.1	3.5
1.8	1.2	1.9	2.0	3.1	2.6	1.5	.9	.6	.5	.5	2.2	3.2	2.2	.9	1.3	.7	.5	.5	2.1	2.2	1.9	2.1	1.9	1.9	1.1	1.6	1.8	1.3	1.2	2.3	1.9	1.9	1.7	1.4	1.6
2.4	1.6	1.5	1.6	1.8	2.3	1.8	.8	.6	.6	.6	2.1	2.6	2.3	1.7	1.2	1.1	1.1	.7	.6	1.4	1.4	1.4	1.1	1.3	1.2	1.1	.9	.8	.9	1.5	1.7	1.4	1.7	1.5	1.4
1.3	1.4	1.3	1.3	1.3	1.4	1.4	1.2	1.0	.8	1.8	1.4	1.3	1.3	1.6	1.8	1.5	1.4	1.2	1.0	1.0	1.3	1.4	1.4	1.4	1.2	1.2	1.2	.9	1.1	1.1	1.2	1.1	1.3	1.3	1.2
.9	1.0	1.1	1.1	1.0	1.0	1.0	.9	1.1	1.1	1.1	1.3	1.0	1.0	1.0	1.1	.9	.7	.9	1.1	.9	1.1	1.2	1.0	1.1	1.2	1.2	1.3	1.1	1.1	1.2	1.0	1.0	1.2	1.1	1.1
.7	.7	.9	.9	.7	.7	.6	.5	.5	.7	.7	1.0	.9	.8	.9	.7	.7	.7	.7	.7	.7	.6	.7	.6	.7	.6	.7	.8	.9	1.0	1.0	1.0	.9	.8	.8	.7
.4	.4	.4	.4	.5	.4	.4	.4	.5	.5	.6	.7	.5	.5	.5	.7	1.0	1.2	1.0	.8	.6	.5	.4	.4	.4	.5	.5	.5	.5	.6	.5	.4	.4	.4	.5	.4
.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.5	.5	.5	.5	.5	.6	.8	.8	.7	.6	.4	.4	.4	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.4	.5	.4

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

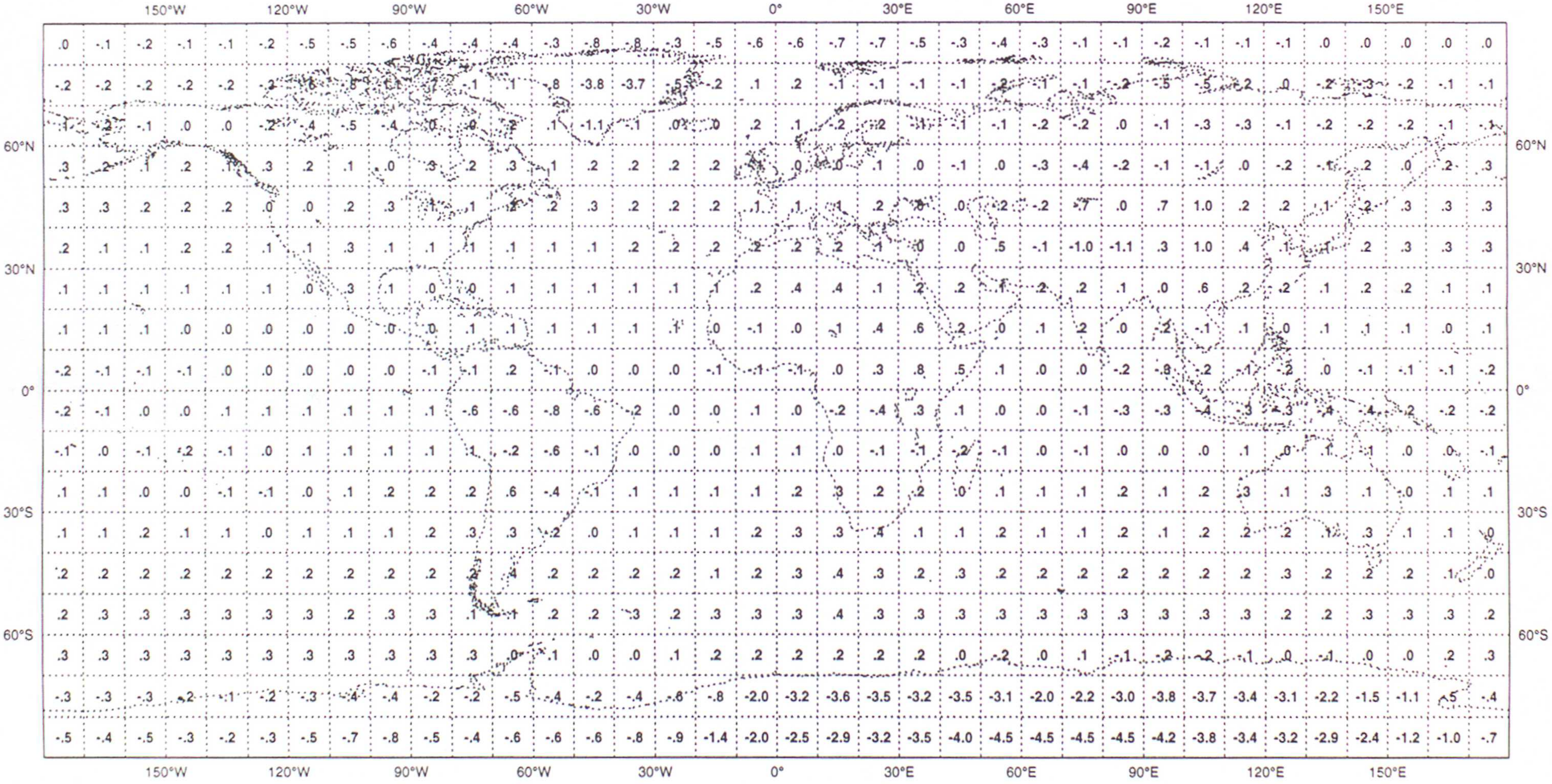
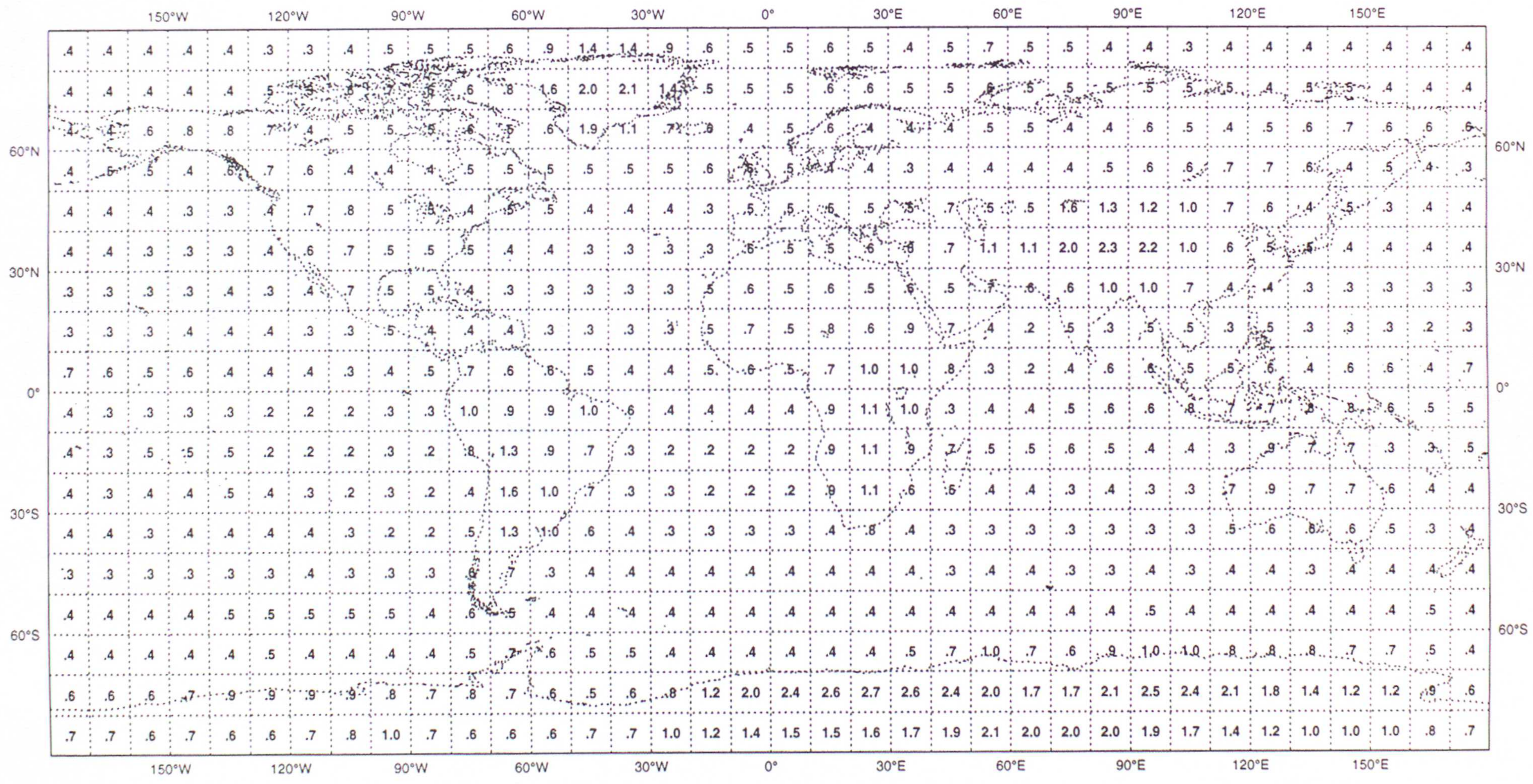
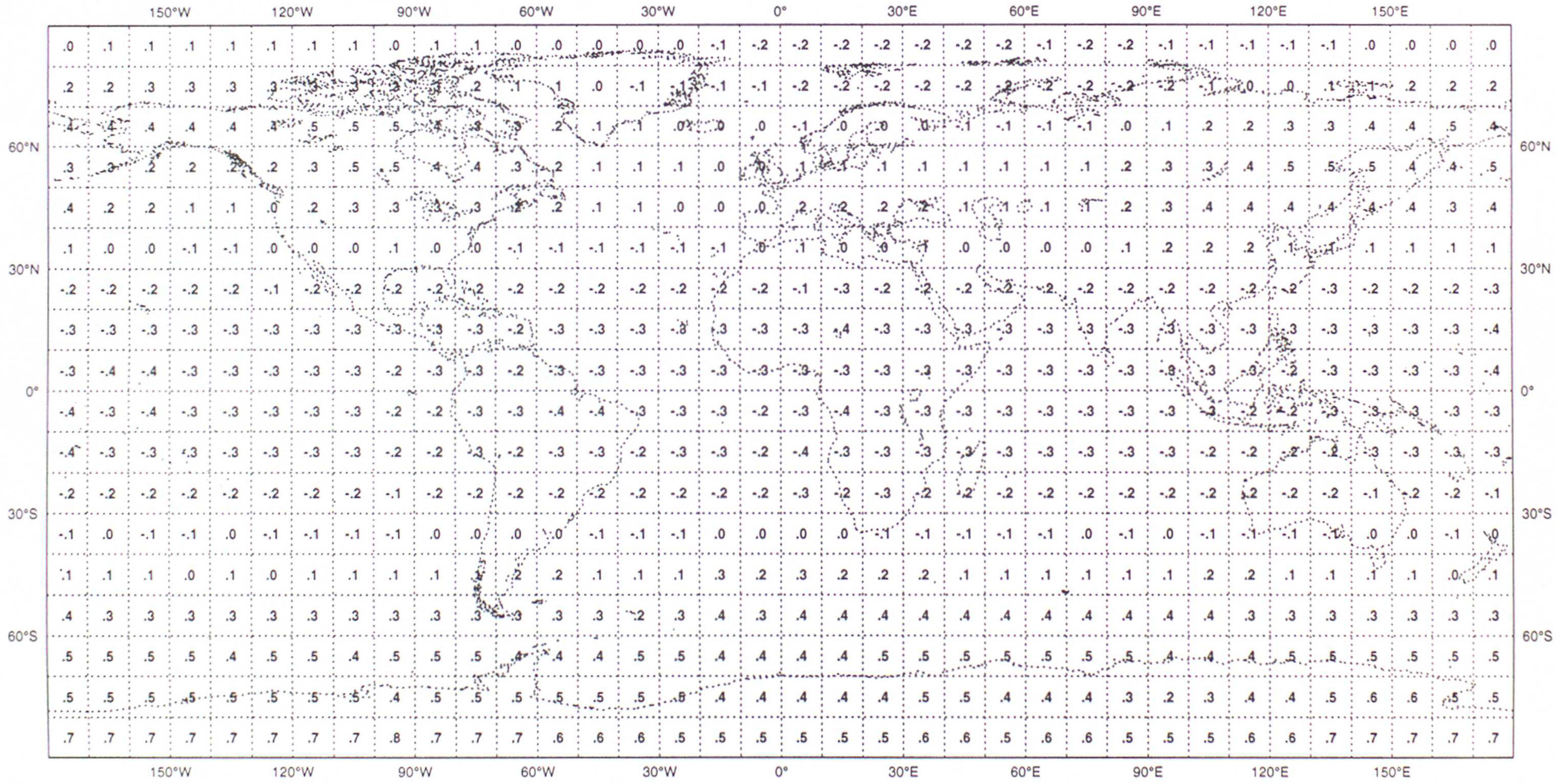

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



.4	.4	.4	.4	.4	.3	.3	.4	.5	.5	.5	.6	.9	1.4	1.4	.9	.6	.5	.5	.6	.5	.4	.5	.7	.5	.5	.4	.4	.3	.4	.4	.4	.4	.4	.4	.4
.4	.4	.4	.4	.4	.5	.5	.5	.7	.5	.6	.8	1.6	2.0	2.1	1.4	.5	.5	.5	.6	.6	.5	.5	.6	.5	.5	.5	.5	.5	.5	.4	.5	.5	.4	.4	.4
.4	.4	.6	.8	.8	.7	.4	.5	.5	.5	.6	.5	.6	1.9	1.1	.7	.8	.4	.5	.6	.4	.4	.4	.5	.5	.4	.4	.6	.5	.4	.5	.6	.7	.6	.6	.6
.4	.5	.5	.4	.6	.7	.6	.4	.4	.4	.5	.5	.5	.5	.5	.5	.6	.5	.5	.4	.4	.3	.4	.4	.4	.4	.4	.5	.6	.6	.7	.7	.6	.4	.5	.4	.3
.4	.4	.4	.3	.3	.4	.7	.8	.5	.5	.4	.5	.5	.4	.4	.4	.3	.5	.5	.6	.5	.5	.7	.5	.5	.5	1.6	1.3	1.2	1.0	.7	.6	.4	.5	.3	.4	.4
.4	.4	.3	.3	.3	.4	.6	.7	.5	.5	.5	.4	.4	.3	.3	.3	.3	.6	.5	.5	.6	.6	.7	1.1	1.1	2.0	2.3	2.2	1.0	.6	.5	.5	.4	.4	.4	.4
.3	.3	.3	.3	.4	.3	.4	.7	.5	.5	.4	.3	.3	.3	.3	.3	.5	.6	.5	.6	.5	.6	.5	.7	.6	.6	1.0	1.0	.7	.4	.4	.3	.3	.3	.3	.3
.3	.3	.3	.4	.4	.4	.3	.3	.5	.4	.4	.4	.3	.3	.3	.3	.5	.7	.5	.8	.6	.9	.7	.4	.2	.5	.3	.5	.5	.3	.5	.3	.3	.3	.2	.3
.7	.6	.5	.6	.4	.4	.4	.3	.4	.5	.7	.6	.8	.5	.4	.4	.5	.6	.5	.7	1.0	1.0	.8	.3	.2	.4	.6	.6	.5	.5	.6	.4	.6	.6	.4	.7
.4	.3	.3	.3	.3	.2	.2	.2	.3	.3	1.0	.9	.9	1.0	.6	.4	.4	.4	.4	.9	1.1	1.0	.3	.4	.4	.5	.6	.6	.8	.7	.7	.8	.8	.6	.5	.5
.4	.3	.5	.5	.5	.2	.2	.2	.3	.2	.8	1.3	.9	.7	.3	.2	.2	.2	.2	.9	1.1	.9	.7	.5	.5	.6	.5	.4	.4	.3	.9	.7	.7	.3	.3	.5
.4	.3	.4	.4	.5	.4	.3	.2	.3	.2	.4	1.6	1.0	.7	.3	.3	.2	.2	.2	.9	1.1	.6	.5	.4	.4	.3	.4	.3	.3	.7	.9	.7	.7	.6	.4	.4
.4	.4	.3	.4	.4	.4	.4	.3	.2	.2	.5	1.3	1.0	.6	.4	.3	.3	.3	.3	.4	.8	.4	.3	.3	.3	.3	.3	.3	.3	.5	.6	.8	.6	.5	.3	.4
.3	.3	.3	.3	.3	.3	.4	.3	.3	.3	.6	.7	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.4	.4	.3	.3	.4	.3	.4	.4	.3	.4	.4	.4	.4
.4	.4	.4	.4	.5	.5	.5	.5	.5	.4	.6	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.5	.4
.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.5	.7	.6	.5	.5	.4	.4	.4	.4	.4	.4	.5	.7	1.0	.7	.6	.9	1.0	1.0	.8	.8	.8	.7	.7	.5	.4
.6	.6	.6	.7	.9	.9	.9	.9	.8	.7	.8	.7	.6	.5	.6	.8	1.2	2.0	2.4	2.6	2.7	2.6	2.4	2.0	1.7	1.7	2.1	2.5	2.4	2.1	1.8	1.4	1.2	1.2	.9	.6
.7	.7	.6	.7	.6	.6	.7	.8	1.0	.7	.6	.6	.6	.7	.7	1.0	1.2	1.4	1.5	1.5	1.6	1.7	1.9	2.1	2.0	2.0	2.0	1.9	1.7	1.4	1.2	1.0	1.0	1.0	.8	.7

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations



.0	.1	.1	.1	.1	.1	.1	.1	.0	.1	.1	.0	.0	.0	.0	.0	-.1	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.1	-.2	-.2	-.1	-.1	-.1	-.1	-.1	.0	.0	.0	.0
.2	.2	.3	.3	.3	.3	.3	.3	.3	.3	.2	.1	.1	.0	-.1	-.1	-.1	-.1	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.1	.0	.0	.1	.1	.2	.2	.2
.4	.4	.4	.4	.4	.4	.5	.5	.5	.4	.3	.3	.2	.1	.1	.0	.0	.0	-.1	.0	.0	.0	-.1	-.1	-.1	-.1	.0	.1	.2	.2	.3	.3	.4	.4	.5	.4
.3	.3	.2	.2	.2	.2	.3	.5	.5	.4	.4	.3	.2	.1	.1	.1	.0	.0	.1	.1	.1	.1	.1	.1	.1	.1	.2	.3	.3	.4	.5	.5	.5	.4	.4	.5
.4	.2	.2	.1	.1	.0	.2	.3	.3	.3	.3	.2	.2	.1	.1	.0	.0	.0	.2	.2	.2	.2	.1	.1	.1	.1	.2	.3	.4	.4	.4	.4	.4	.4	.3	.4
.1	.0	.0	-.1	-.1	.0	.0	.0	.1	.0	.0	-.1	-.1	-.1	-.1	-.1	-.1	.0	.1	.0	.0	.1	.0	.0	.0	.0	.1	.2	.2	.2	.1	.1	.1	.1	.1	.1
-.2	-.2	-.2	-.2	-.2	-.1	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.1	-.3	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.3	-.2	-.2	-.2	-.3
-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.2	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.4	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.4
-.3	-.4	-.4	-.3	-.3	-.3	-.3	-.3	-.2	-.3	-.3	-.2	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.2	-.3	-.3	-.3	-.3	-.4
-.4	-.3	-.4	-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.3	-.3	-.4	-.4	-.3	-.3	-.3	-.2	-.3	-.4	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.3	-.3	-.3	-.3	-.3
-.4	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.3	-.2	-.3	-.3	-.2	-.3	-.3	-.2	-.4	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.2	-.2	-.3	-.3	-.3	-.3
-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.1	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.3	-.2	-.3	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.1	-.2	-.2	-.1
-.1	.0	-.1	-.1	.0	-.1	-.1	-.1	-.1	.0	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	.0	-.1	-.1	-.1	-.1	-.1	.0	-.1	.0	-.1	-.1	-.1	-.1	.0	.0	-.1	.0
.1	.1	.1	.0	.1	.0	.1	.1	.1	.1	.1	.2	.2	.1	.1	.1	.3	.2	.3	.2	.2	.2	.1	.1	.1	.1	.1	.1	.2	.2	.1	.1	.1	.1	.0	.1
.4	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.2	.3	.4	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.3	.3	.3
.5	.5	.5	.5	.4	.5	.5	.4	.5	.5	.5	.4	.4	.4	.5	.5	.4	.4	.4	.4	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.5	.5	.5	.5	.5	.5
.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.5	.5	.4	.4	.4	.3	.2	.3	.4	.4	.5	.6	.6	.5	.5
.7	.7	.7	.7	.7	.7	.7	.7	.8	.7	.7	.7	.6	.6	.6	.5	.5	.5	.5	.5	.5	.6	.6	.5	.6	.6	.5	.5	.5	.6	.6	.7	.7	.7	.7	.7

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

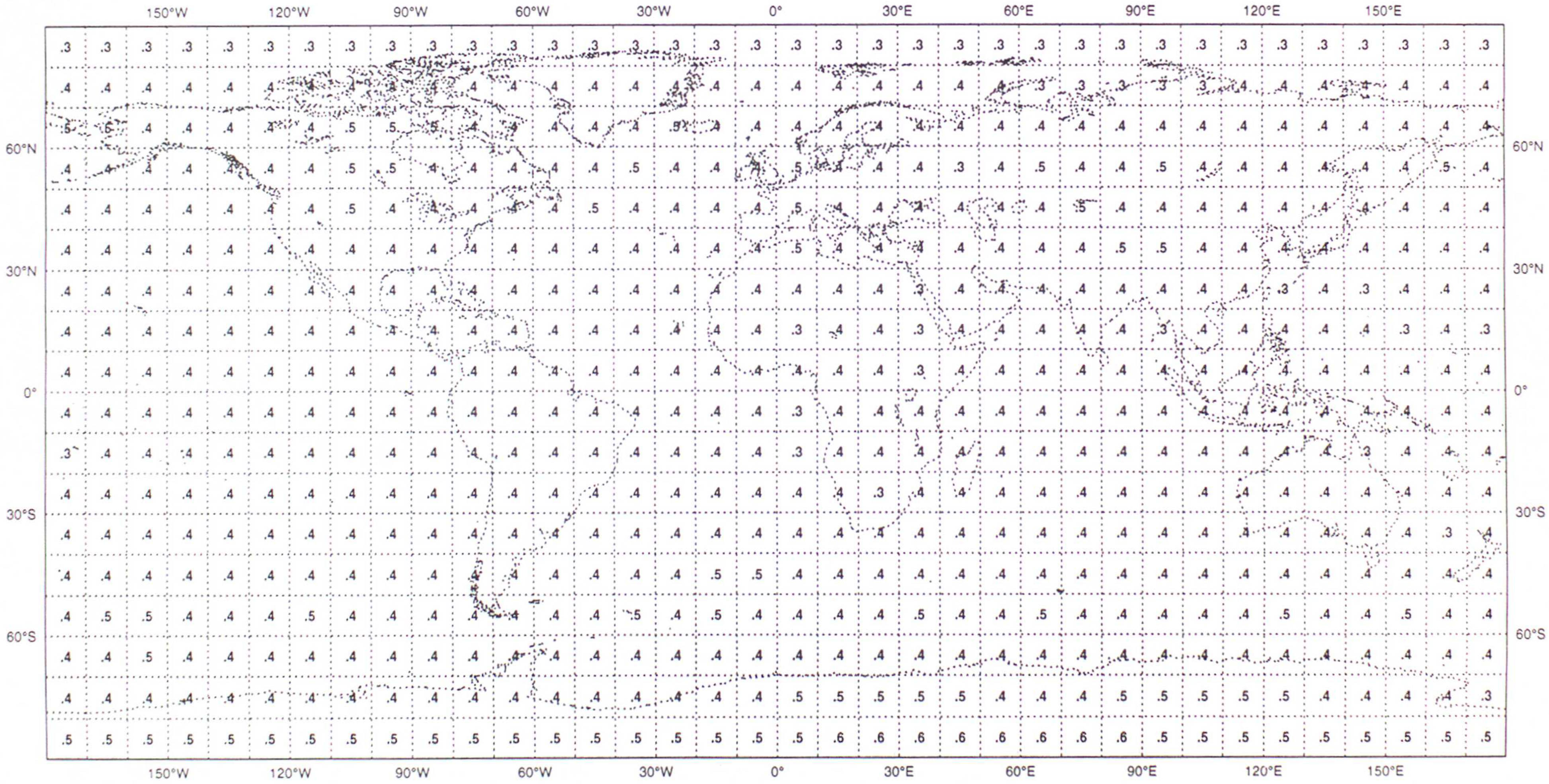

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

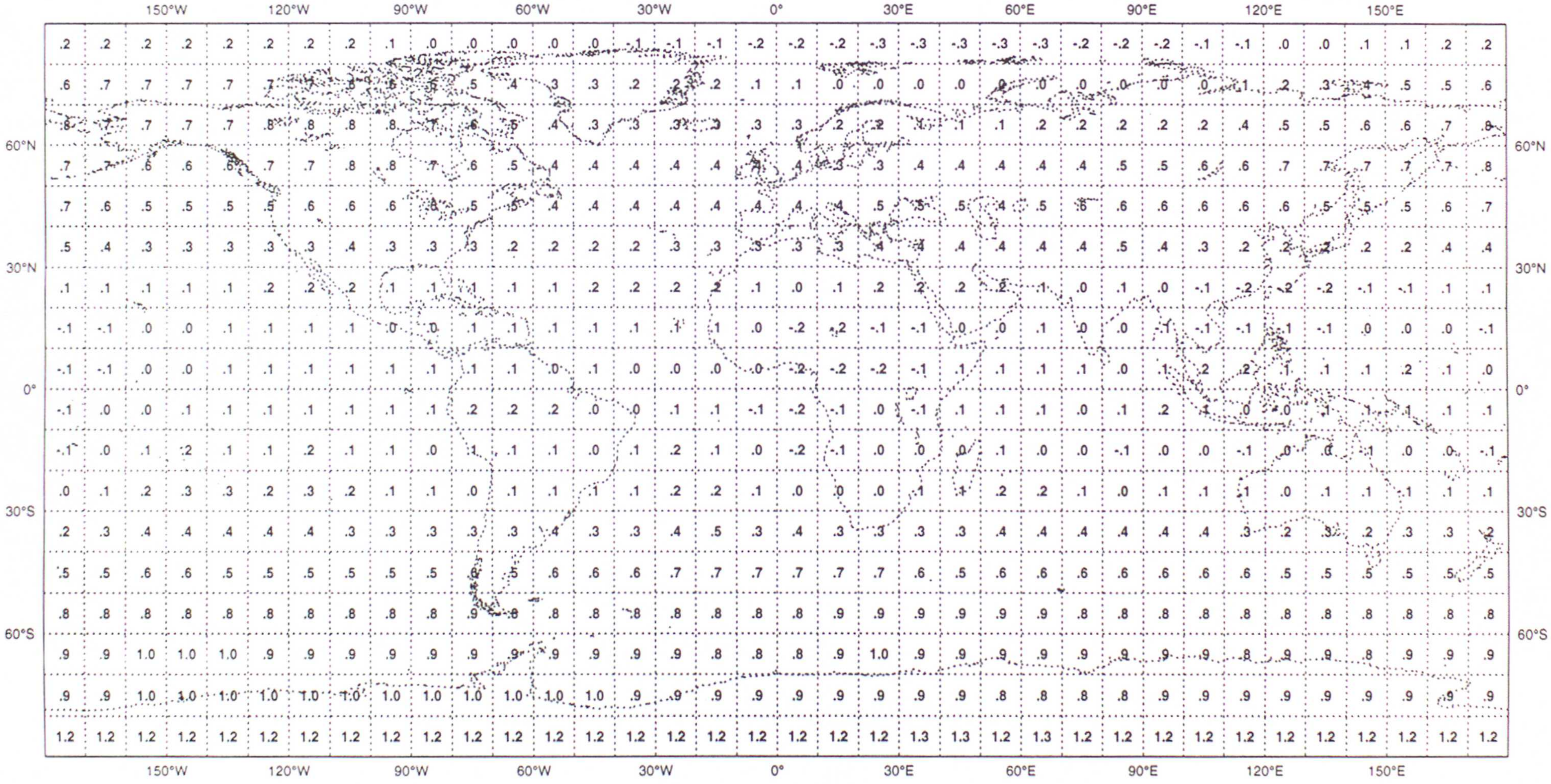

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .2 .2 .2 .2 .2 .2 .1 .0 .0 .0 .0 .0 -.1 -.1 -.1 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.1 -.1 .0 .0 .1 .1 .2 .2
.6 .7 .7 .7 .7 .7 .7 .8 .6 .6 .5 .4 .3 .3 .2 .2 .2 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .2 .3 .4 .5 .5 .6
.8 .7 .7 .7 .7 .8 .8 .8 .8 .7 .6 .5 .4 .3 .3 .3 .3 .3 .3 .2 .2 .1 .1 .1 .2 .2 .2 .2 .2 .4 .5 .5 .6 .6 .7 .8
.7 .7 .6 .6 .6 .7 .7 .8 .8 .7 .6 .5 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .5 .5 .6 .6 .7 .7 .7 .7 .8
.7 .6 .5 .5 .5 .5 .6 .6 .6 .6 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .5 .6 .6 .6 .6 .6 .6 .5 .5 .5 .6 .7
.5 .4 .3 .3 .3 .3 .3 .4 .3 .3 .3 .2 .2 .2 .2 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .5 .4 .3 .2 .2 .2 .2 .2 .4 .4
.1 .1 .1 .1 .1 .2 .2 .2 .1 .1 .1 .1 .1 .2 .2 .2 .2 .1 .0 .1 .2 .2 .2 .2 .1 .0 .1 .0 -.1 -.2 -.2 -.2 -.1 -.1 .1 .1
-.1 -.1 .0 .0 .1 .1 .1 .1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .0 -.2 -.2 -.1 -.1 .0 .0 .1 .0 .0 -.1 -.1 -.1 -.1 -.1 .0 .0 .0 -.1
-.1 -.1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .1 .0 .1 .0 .0 .0 .0 -.2 -.2 -.2 -.1 .1 .1 .1 .1 .0 .1 .2 .2 .1 .1 .1 .2 .1 .0
-.1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .2 .2 .2 .0 .0 .1 .1 -.1 -.2 -.1 .0 -.1 .1 .1 .1 .0 .1 .2 .1 .0 .0 .1 .1 .1 .1 .1
-.1 .0 .1 .2 .1 .1 .2 .1 .1 .0 .1 .1 .1 .0 .1 .2 .1 .0 -.2 -.1 .0 .0 .0 .1 .0 .0 -.1 .0 .0 -.1 .0 .0 -.1 .0 .0 -.1
.0 .1 .2 .3 .3 .2 .3 .2 .1 .1 .0 .1 .1 .1 .1 .2 .2 .1 .0 .0 .0 .1 .1 .2 .2 .1 .0 .1 .1 .1 .0 .1 .1 .1 .1 .1
.2 .3 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .3 .3 .4 .5 .3 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .2 .3 .2 .3 .3 .2
.5 .5 .6 .6 .5 .5 .5 .5 .5 .5 .6 .5 .6 .6 .6 .7 .7 .7 .7 .7 .7 .6 .5 .6 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5
.8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
.9 .9 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .8 .8 .8 .9 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .8 .9 .9 .8 .9 .9 .9
.9 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .9 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9 .9 .9 .9
1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.3 1.3 1.2 1.3 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

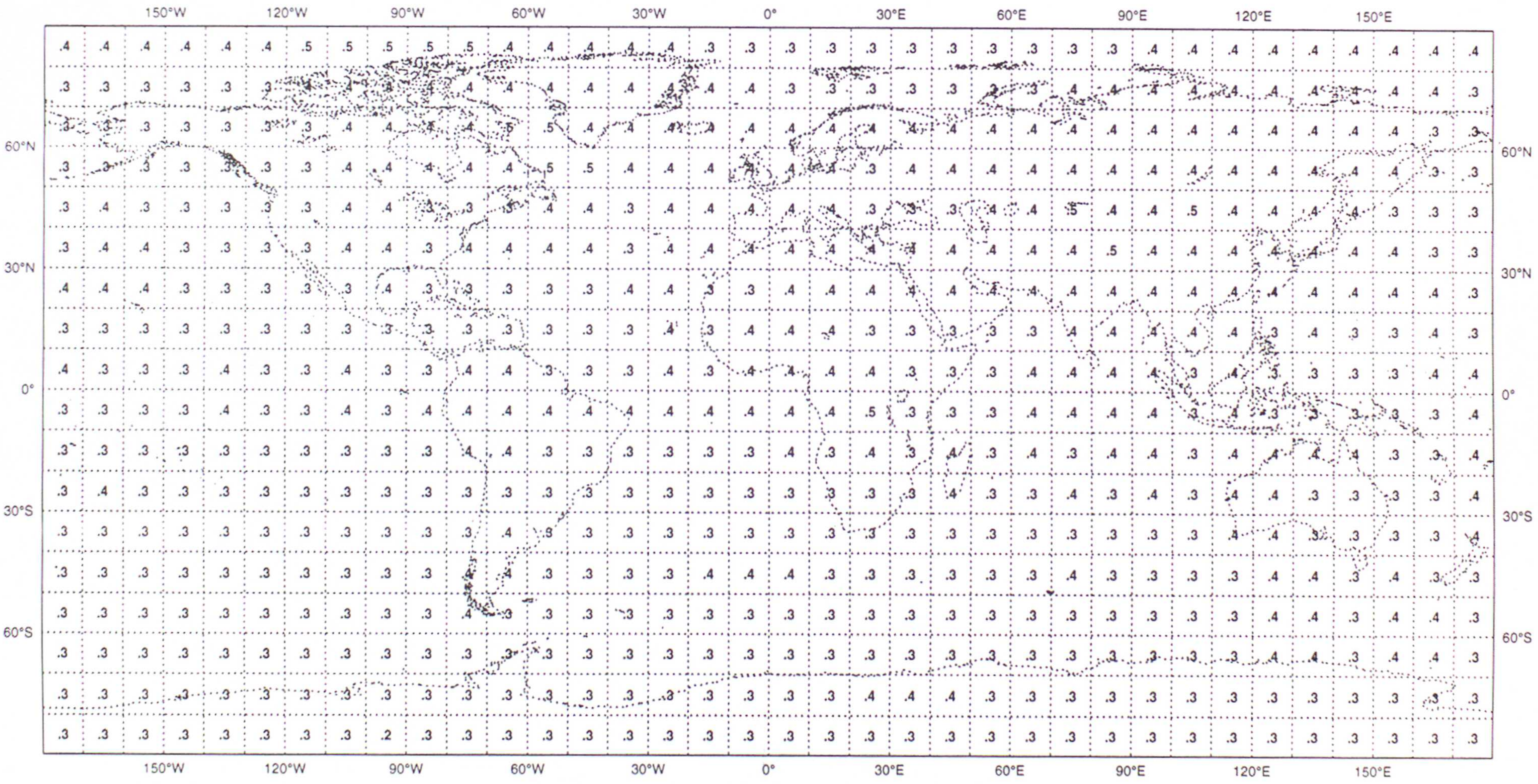
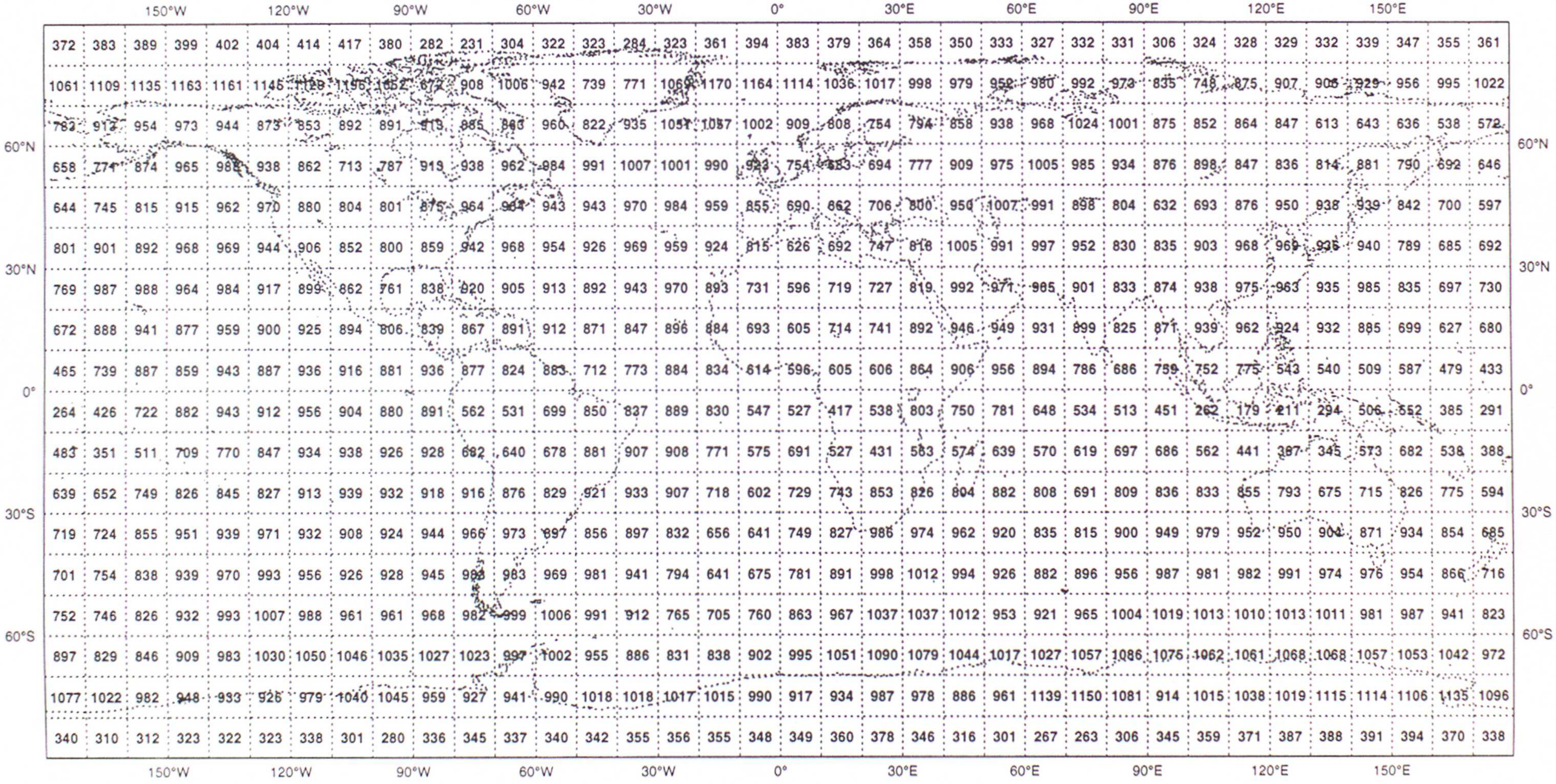
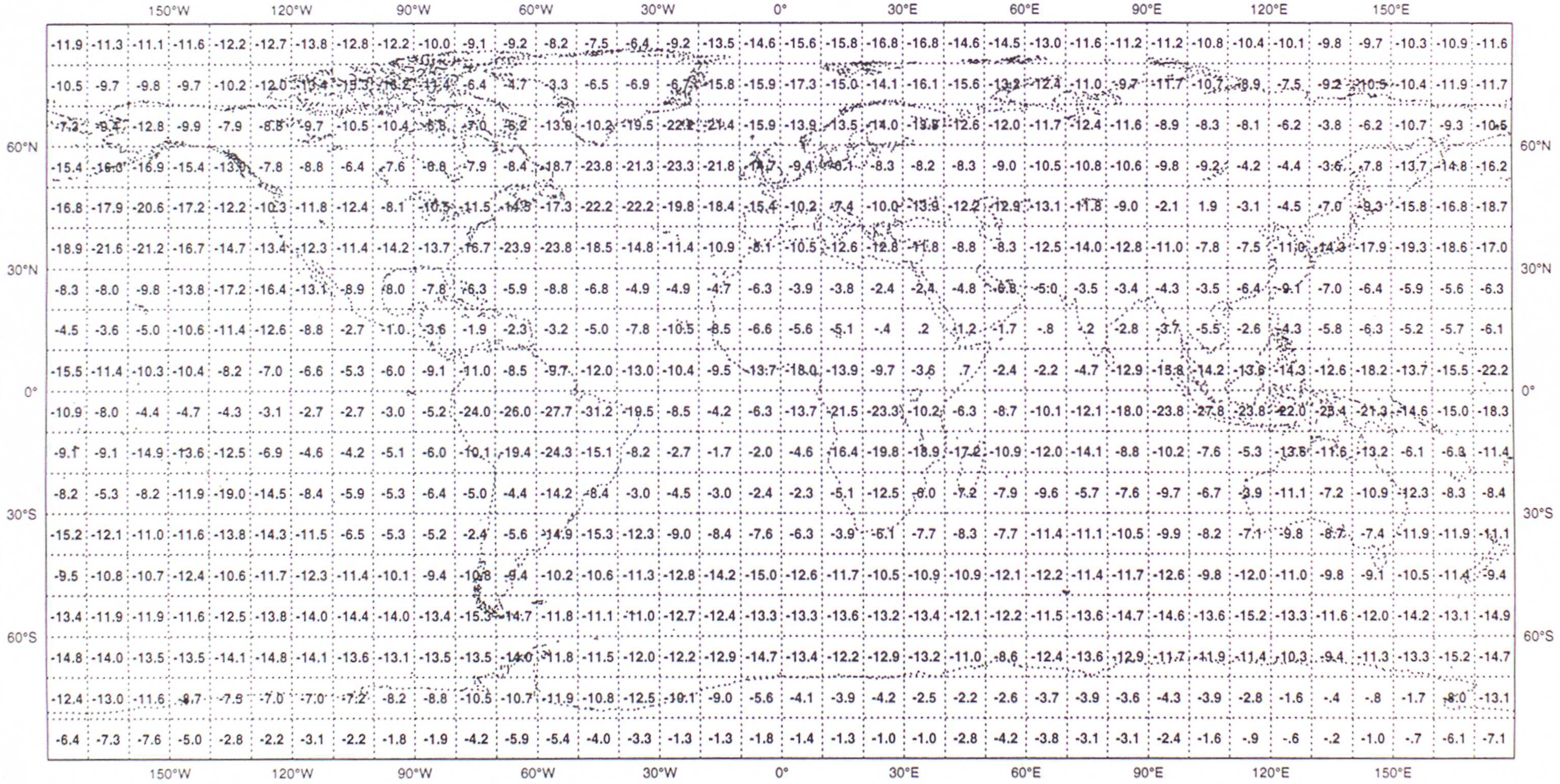

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 55. ATOVS mean daily count. FEBRUARY 2003
NOAA17, using all observations
Global average number of observations in 24 hours = 519589



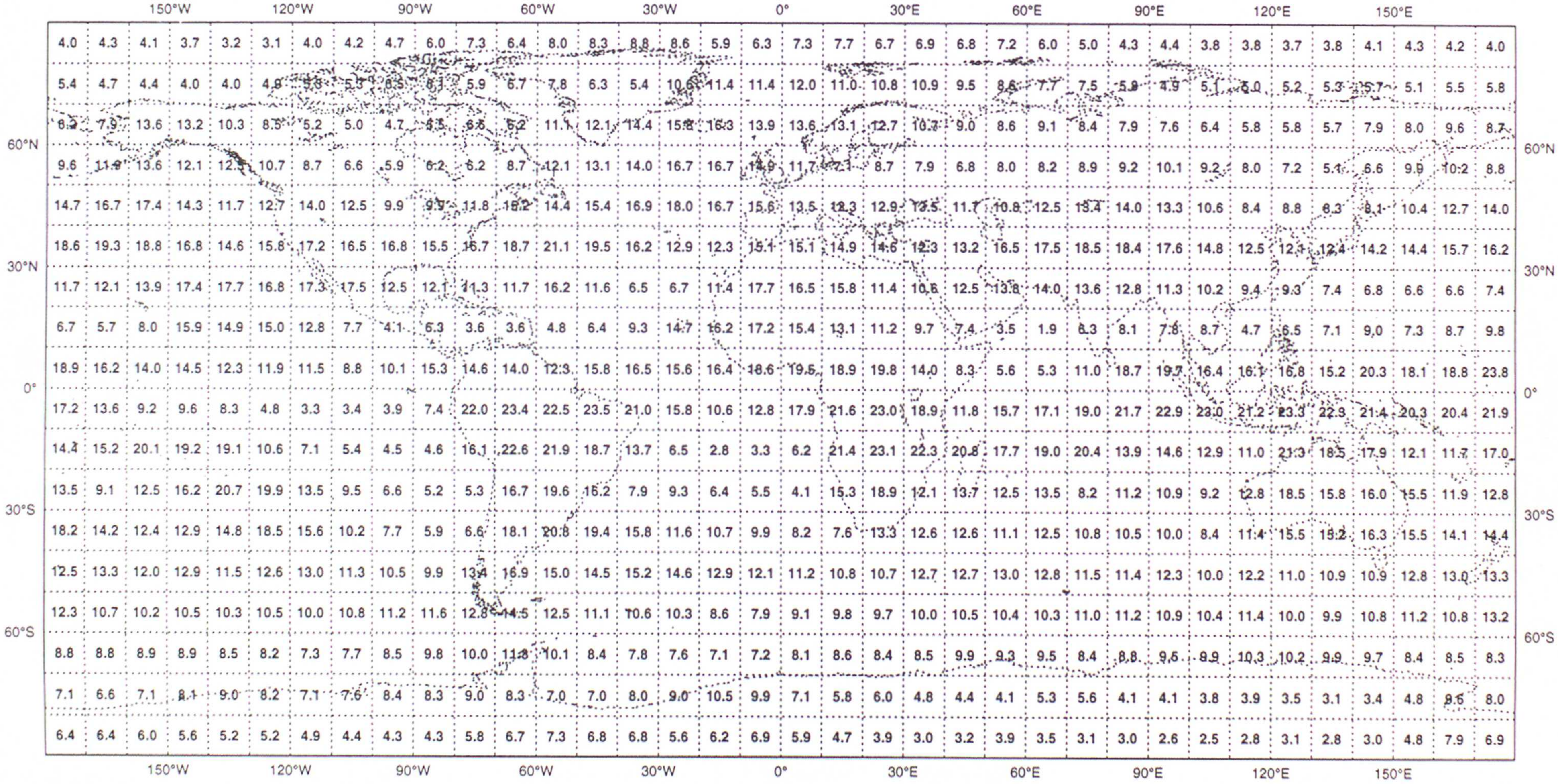
372	383	389	399	402	404	414	417	380	282	231	304	322	323	284	323	361	394	383	379	364	358	350	333	327	332	331	306	324	328	329	332	339	347	355	361
1061	1109	1135	1163	1161	1145	1128	1156	1052	872	908	1006	942	739	771	1069	1170	1164	1114	1036	1017	998	979	952	980	992	973	835	748	875	907	905	929	956	995	1022
782	912	954	973	944	873	853	892	891	913	885	863	960	822	935	1051	1057	1002	909	808	754	794	858	938	968	1024	1001	875	852	864	847	613	643	636	538	572
658	774	874	965	988	938	862	713	787	913	938	962	984	991	1007	1001	990	923	754	683	694	777	909	975	1005	985	934	876	898	847	836	814	881	790	692	646
644	745	815	915	962	970	880	804	801	875	964	964	943	943	970	984	959	855	690	862	706	800	950	1007	991	898	804	632	693	876	950	938	939	842	700	597
801	901	892	968	969	944	906	852	800	859	942	968	954	926	969	959	924	815	626	692	747	818	1005	991	997	952	830	835	903	968	969	936	940	789	685	692
769	987	988	964	984	917	899	862	761	838	920	905	913	892	943	970	893	731	596	719	727	819	992	971	965	901	833	874	938	975	963	935	985	835	697	730
672	888	941	877	959	900	925	894	806	839	867	891	912	871	847	896	884	693	605	714	741	892	946	949	931	899	825	871	939	962	924	932	885	699	627	680
465	739	887	859	943	887	936	916	881	936	877	824	883	712	773	884	834	614	596	605	606	864	906	956	894	786	686	759	752	775	543	540	509	587	479	433
264	426	722	882	943	912	956	904	880	891	562	531	699	850	837	889	830	547	527	417	538	803	750	781	648	534	513	451	262	179	211	294	506	552	385	291
483	351	511	709	770	847	934	938	926	928	682	640	678	881	907	908	771	575	691	527	431	583	574	639	570	619	697	686	562	441	387	345	573	682	538	388
639	652	749	826	845	827	913	939	932	918	916	876	829	921	933	907	718	602	729	743	853	826	804	882	808	691	809	836	833	855	793	675	715	826	775	594
719	724	855	951	939	971	932	908	924	944	966	973	897	856	897	832	656	641	749	827	986	974	962	920	835	815	900	949	979	952	950	904	871	934	854	685
701	754	838	939	970	993	956	926	928	945	983	983	969	981	941	794	641	675	781	891	998	1012	994	926	882	896	956	987	981	982	991	974	976	954	866	716
752	746	826	932	993	1007	988	961	961	968	982	999	1006	991	912	765	705	760	863	967	1037	1037	1012	953	921	965	1004	1019	1013	1010	1013	1011	981	987	941	823
897	829	846	909	983	1030	1050	1046	1035	1027	1023	997	1002	955	886	831	838	902	995	1051	1090	1079	1044	1017	1027	1057	1086	1075	1062	1061	1068	1068	1057	1053	1042	972
1077	1022	982	948	933	926	979	1040	1045	959	927	941	990	1018	1018	1017	1015	990	917	934	987	978	886	961	1139	1150	1081	914	1015	1038	1019	1115	1114	1106	1135	1096
340	310	312	323	322	323	338	301	280	336	345	337	340	342	355	356	355	348	349	360	378	346	316	301	267	263	306	345	359	371	387	388	391	394	370	338

Figure 56. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



-11.9	-11.3	-11.1	-11.6	-12.2	-12.7	-13.8	-12.8	-12.2	-10.0	-9.1	-9.2	-8.2	-7.5	-6.4	-9.2	-13.5	-14.6	-15.6	-15.8	-16.8	-16.8	-14.6	-14.5	-13.0	-11.6	-11.2	-11.2	-10.8	-10.4	-10.1	-9.8	-9.7	-10.3	-10.9	-11.6
-10.5	-9.7	-9.8	-9.7	-10.2	-12.0	-13.4	-15.3	-16.2	-11.4	-6.4	-4.7	-3.3	-6.5	-6.9	-6.7	-15.8	-15.9	-17.3	-15.0	-14.1	-16.1	-15.6	-13.2	-12.4	-11.0	-9.7	-11.7	-10.7	-8.9	-7.5	-9.2	-10.5	-10.4	-11.9	-11.7
-7.3	-9.4	-12.8	-9.9	-7.9	-8.8	-9.7	-10.5	-10.4	-6.8	-7.0	-6.2	-13.8	-10.2	-19.5	-22.1	-21.4	-15.9	-13.9	-13.5	-14.0	-13.8	-12.6	-12.0	-11.7	-12.4	-11.6	-8.9	-8.3	-8.1	-6.2	-3.8	-6.2	-10.7	-9.3	-10.5
-15.4	-16.0	-16.9	-15.4	-13.0	-7.8	-8.8	-6.4	-7.6	-6.8	-7.9	-8.4	-18.7	-23.8	-21.3	-23.3	-21.8	-14.7	-9.4	-10.1	-8.3	-8.2	-8.3	-9.0	-10.5	-10.8	-10.6	-9.8	-9.2	-4.2	-4.4	-3.6	-7.8	-13.7	-14.8	-16.2
-16.8	-17.9	-20.6	-17.2	-12.2	-10.3	-11.8	-12.4	-8.1	-10.5	-11.5	-14.5	-17.3	-22.2	-22.2	-19.8	-18.4	-15.4	-10.2	-7.4	-10.0	-13.9	-12.2	-12.9	-13.1	-11.8	-9.0	-2.1	1.9	-3.1	-4.5	-7.0	-9.3	-15.8	-16.8	-18.7
-18.9	-21.6	-21.2	-16.7	-14.7	-13.4	-12.3	-11.4	-14.2	-13.7	-16.7	-23.9	-23.8	-18.5	-14.8	-11.4	-10.9	-8.1	-10.5	-12.6	-12.8	-11.8	-8.8	-8.3	-12.5	-14.0	-12.8	-11.0	-7.8	-7.5	-11.0	-14.3	-17.9	-19.3	-18.6	-17.0
-8.3	-8.0	-9.8	-13.8	-17.2	-16.4	-13.1	-8.9	-8.0	-7.8	-6.3	-5.9	-8.8	-6.8	-4.9	-4.9	-4.7	-6.3	-3.9	-3.8	-2.4	-2.4	-4.8	-6.8	-5.0	-3.5	-3.4	-4.3	-3.5	-6.4	-9.1	-7.0	-6.4	-5.9	-5.6	-6.3
-4.5	-3.6	-5.0	-10.6	-11.4	-12.6	-8.8	-2.7	-1.0	-3.6	-1.9	-2.3	-3.2	-5.0	-7.8	-10.5	-8.5	-6.6	-5.6	-5.1	-.4	.2	-1.2	-1.7	-.8	-.2	-2.8	-3.7	-5.5	-2.6	-4.3	-5.8	-6.3	-5.2	-5.7	-6.1
-15.5	-11.4	-10.3	-10.4	-8.2	-7.0	-6.6	-5.3	-6.0	-9.1	-11.0	-8.5	-9.7	-12.0	-13.0	-10.4	-9.5	-13.7	-18.0	-13.9	-9.7	-3.6	.7	-2.4	-2.2	-4.7	-12.9	-15.8	-14.2	-13.6	-14.3	-12.6	-18.2	-13.7	-15.5	-22.2
-10.9	-8.0	-4.4	-4.7	-4.3	-3.1	-2.7	-2.7	-3.0	-5.2	-24.0	-26.0	-27.7	-31.2	-19.5	-8.5	-4.2	-6.3	-13.7	-21.5	-23.3	-10.2	-6.3	-8.7	-10.1	-12.1	-18.0	-23.8	-27.8	-23.8	-22.0	-25.4	-21.3	-14.6	-15.0	-18.3
-9.1	-9.1	-14.9	-13.6	-12.5	-6.9	-4.6	-4.2	-5.1	-6.0	-10.1	-19.4	-24.3	-15.1	-8.2	-2.7	-1.7	-2.0	-4.6	-16.4	-19.8	-18.9	-17.2	-10.9	-12.0	-14.1	-8.8	-10.2	-7.6	-5.3	-13.6	-11.6	-13.2	-6.1	-6.3	-11.4
-8.2	-5.3	-8.2	-11.9	-19.0	-14.5	-8.4	-5.9	-5.3	-6.4	-5.0	-4.4	-14.2	-8.4	-3.0	-4.5	-3.0	-2.4	-2.3	-5.1	-12.5	-6.0	-7.2	-7.9	-9.6	-5.7	-7.6	-9.7	-6.7	-3.9	-11.1	-7.2	-10.9	-12.3	-8.3	-8.4
-15.2	-12.1	-11.0	-11.6	-13.8	-14.3	-11.5	-6.5	-5.3	-5.2	-2.4	-5.6	-14.9	-15.3	-12.3	-9.0	-8.4	-7.6	-6.3	-3.9	-6.1	-7.7	-8.3	-7.7	-11.4	-11.1	-10.5	-9.9	-8.2	-7.1	-9.8	-8.7	-7.4	-11.9	-11.9	-11.1
-9.5	-10.8	-10.7	-12.4	-10.6	-11.7	-12.3	-11.4	-10.1	-9.4	-10.8	-9.4	-10.2	-10.6	-11.3	-12.8	-14.2	-15.0	-12.6	-11.7	-10.5	-10.9	-10.9	-12.1	-12.2	-11.4	-11.7	-12.6	-9.8	-12.0	-11.0	-9.8	-9.1	-10.5	-11.4	-9.4
-13.4	-11.9	-11.9	-11.6	-12.5	-13.8	-14.0	-14.4	-14.0	-13.4	-15.3	-14.7	-11.8	-11.1	-11.0	-12.7	-12.4	-13.3	-13.3	-13.6	-13.2	-13.4	-12.1	-12.2	-11.5	-13.6	-14.7	-14.6	-13.6	-15.2	-13.3	-11.6	-12.0	-14.2	-13.1	-14.9
-14.8	-14.0	-13.5	-13.5	-14.1	-14.8	-14.1	-13.6	-13.1	-13.5	-13.5	-14.0	-11.8	-11.5	-12.0	-12.2	-12.9	-14.7	-13.4	-12.2	-12.9	-13.2	-11.0	-8.6	-12.4	-13.6	-12.9	-11.7	-11.9	-11.4	-10.3	-9.4	-11.3	-13.3	-15.2	-14.7
-12.4	-13.0	-11.6	-8.7	-7.5	-7.0	-7.0	-7.2	-8.2	-8.8	-10.5	-10.7	-11.9	-10.8	-12.5	-10.1	-9.0	-5.6	-4.1	-3.9	-4.2	-2.5	-2.2	-2.6	-3.7	-3.9	-3.6	-4.3	-3.9	-2.8	-1.6	-.4	-.8	-1.7	-8.0	-13.1
-6.4	-7.3	-7.6	-5.0	-2.8	-2.2	-3.1	-2.2	-1.8	-1.9	-4.2	-5.9	-5.4	-4.0	-3.3	-1.3	-1.3	-1.8	-1.4	-1.3	-1.0	-1.0	-2.8	-4.2	-3.8	-3.1	-3.1	-2.4	-1.6	-.9	-.6	-.2	-1.0	-.7	-6.1	-7.1

Figure 57. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



4.0	4.3	4.1	3.7	3.2	3.1	4.0	4.2	4.7	6.0	7.3	6.4	8.0	8.3	8.8	8.6	5.9	6.3	7.3	7.7	6.7	6.9	6.8	7.2	6.0	5.0	4.3	4.4	3.8	3.8	3.7	3.8	4.1	4.3	4.2	4.0
5.4	4.7	4.4	4.0	4.0	4.8	5.8	5.3	8.5	6.1	5.9	6.7	7.8	6.3	5.4	10.6	11.4	11.4	12.0	11.0	10.8	10.9	9.5	8.6	7.7	7.5	5.9	4.9	5.1	6.0	5.2	5.3	5.7	5.1	5.5	5.8
8.2	7.9	13.6	13.2	10.3	8.5	5.2	5.0	4.7	5.5	6.6	5.2	11.1	12.1	14.4	15.8	16.3	13.9	13.6	13.1	12.7	10.7	9.0	8.6	9.1	8.4	7.9	7.6	6.4	5.8	5.8	5.7	7.9	8.0	9.6	8.7
9.6	11.9	13.6	12.1	12.5	10.7	8.7	6.6	5.9	6.2	6.2	8.7	12.1	13.1	14.0	16.7	16.7	14.9	11.7	7.1	8.7	7.9	6.8	8.0	8.2	8.9	9.2	10.1	9.2	8.0	7.2	5.1	6.6	9.9	10.2	8.8
14.7	16.7	17.4	14.3	11.7	12.7	14.0	12.5	9.9	9.9	11.8	18.2	14.4	15.4	16.9	18.0	16.7	15.6	13.5	12.3	12.9	13.5	11.7	10.8	12.5	13.4	14.0	13.3	10.6	8.4	8.8	8.3	8.1	10.4	12.7	14.0
18.6	19.3	18.8	16.8	14.6	15.8	17.2	16.5	16.8	15.5	16.7	18.7	21.1	19.5	16.2	12.9	12.3	15.1	15.1	14.9	14.6	12.3	13.2	16.5	17.5	18.5	18.4	17.6	14.8	12.5	12.1	12.4	14.2	14.4	15.7	16.2
11.7	12.1	13.9	17.4	17.7	16.8	17.3	17.5	12.5	12.1	11.3	11.7	16.2	11.6	6.5	6.7	11.4	17.7	16.5	15.8	11.4	10.6	12.5	13.8	14.0	13.6	12.8	11.3	10.2	9.4	9.3	7.4	6.8	6.6	6.6	7.4
6.7	5.7	8.0	15.9	14.9	15.0	12.8	7.7	4.1	6.3	3.6	3.6	4.8	6.4	9.3	14.7	16.2	17.2	15.4	13.1	11.2	9.7	7.4	3.5	1.9	8.3	8.1	7.8	8.7	4.7	6.5	7.1	9.0	7.3	8.7	9.8
18.9	16.2	14.0	14.5	12.3	11.9	11.5	8.8	10.1	15.3	14.6	14.0	12.3	15.8	16.5	15.6	16.4	18.6	19.5	18.9	19.8	14.0	8.3	5.6	5.3	11.0	18.7	19.7	16.4	16.1	16.8	15.2	20.3	18.1	18.8	23.8
17.2	13.6	9.2	9.6	8.3	4.8	3.3	3.4	3.9	7.4	22.0	23.4	22.5	23.5	21.0	15.8	10.6	12.8	17.9	21.6	23.0	18.9	11.8	15.7	17.1	19.0	21.7	22.9	23.0	21.2	23.3	22.9	21.4	20.3	20.4	21.9
14.4	15.2	20.1	19.2	19.1	10.6	7.1	5.4	4.5	4.6	16.1	22.6	21.9	18.7	13.7	6.5	2.8	3.3	6.2	21.4	23.1	22.3	20.8	17.7	19.0	20.4	13.9	14.6	12.9	11.0	21.3	18.5	17.9	12.1	11.7	17.0
13.5	9.1	12.5	16.2	20.7	19.9	13.5	9.5	6.6	5.2	5.3	16.7	19.6	16.2	7.9	9.3	6.4	5.5	4.1	15.3	18.9	12.1	13.7	12.5	13.5	8.2	11.2	10.9	9.2	12.8	18.5	15.8	16.0	15.5	11.9	12.8
18.2	14.2	12.4	12.9	14.8	18.5	15.6	10.2	7.7	5.9	6.6	18.1	20.8	19.4	15.8	11.6	10.7	9.9	8.2	7.6	13.3	12.6	12.6	11.1	12.5	10.8	10.5	10.0	8.4	11.4	15.5	15.2	16.3	15.5	14.1	14.4
12.5	13.3	12.0	12.9	11.5	12.6	13.0	11.3	10.5	9.9	13.4	16.9	15.0	14.5	15.2	14.6	12.9	12.1	11.2	10.8	10.7	12.7	12.7	13.0	12.8	11.5	11.4	12.3	10.0	12.2	11.0	10.9	10.9	12.8	13.0	13.3
12.3	10.7	10.2	10.5	10.3	10.5	10.0	10.8	11.2	11.6	12.8	14.5	12.5	11.1	10.6	10.3	8.6	7.9	9.1	9.8	9.7	10.0	10.5	10.4	10.3	11.0	11.2	10.9	10.4	11.4	10.0	9.9	10.8	11.2	10.8	13.2
8.8	8.8	8.9	8.9	8.5	8.2	7.3	7.7	8.5	9.8	10.0	11.8	10.1	8.4	7.8	7.6	7.1	7.2	8.1	8.6	8.4	8.5	9.9	9.3	9.5	8.4	8.8	9.6	9.9	10.3	10.2	9.9	9.7	8.4	8.5	8.3
7.1	6.6	7.1	8.1	9.0	8.2	7.1	7.6	8.4	8.3	9.0	8.3	7.0	7.0	8.0	9.0	10.5	9.9	7.1	5.8	6.0	4.8	4.4	4.1	5.3	5.6	4.1	4.1	3.8	3.9	3.5	3.1	3.4	4.8	8.5	8.0
6.4	6.4	6.0	5.6	5.2	5.2	4.9	4.4	4.3	4.3	5.8	6.7	7.3	6.8	6.8	5.6	6.2	6.9	5.9	4.7	3.9	3.0	3.2	3.9	3.5	3.1	3.0	2.6	2.5	2.8	3.1	2.8	3.0	4.8	7.9	6.9

Figure 58. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations

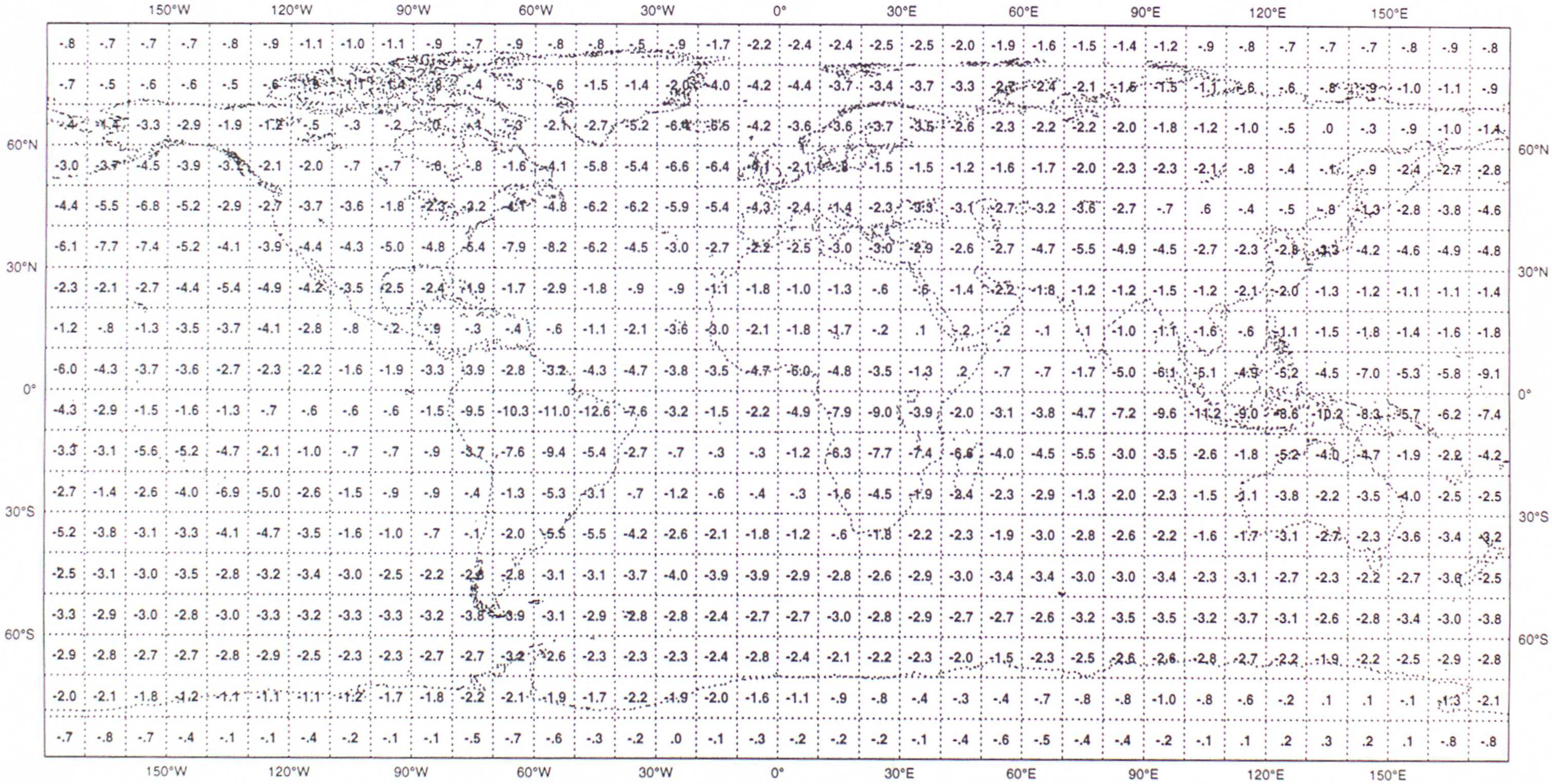
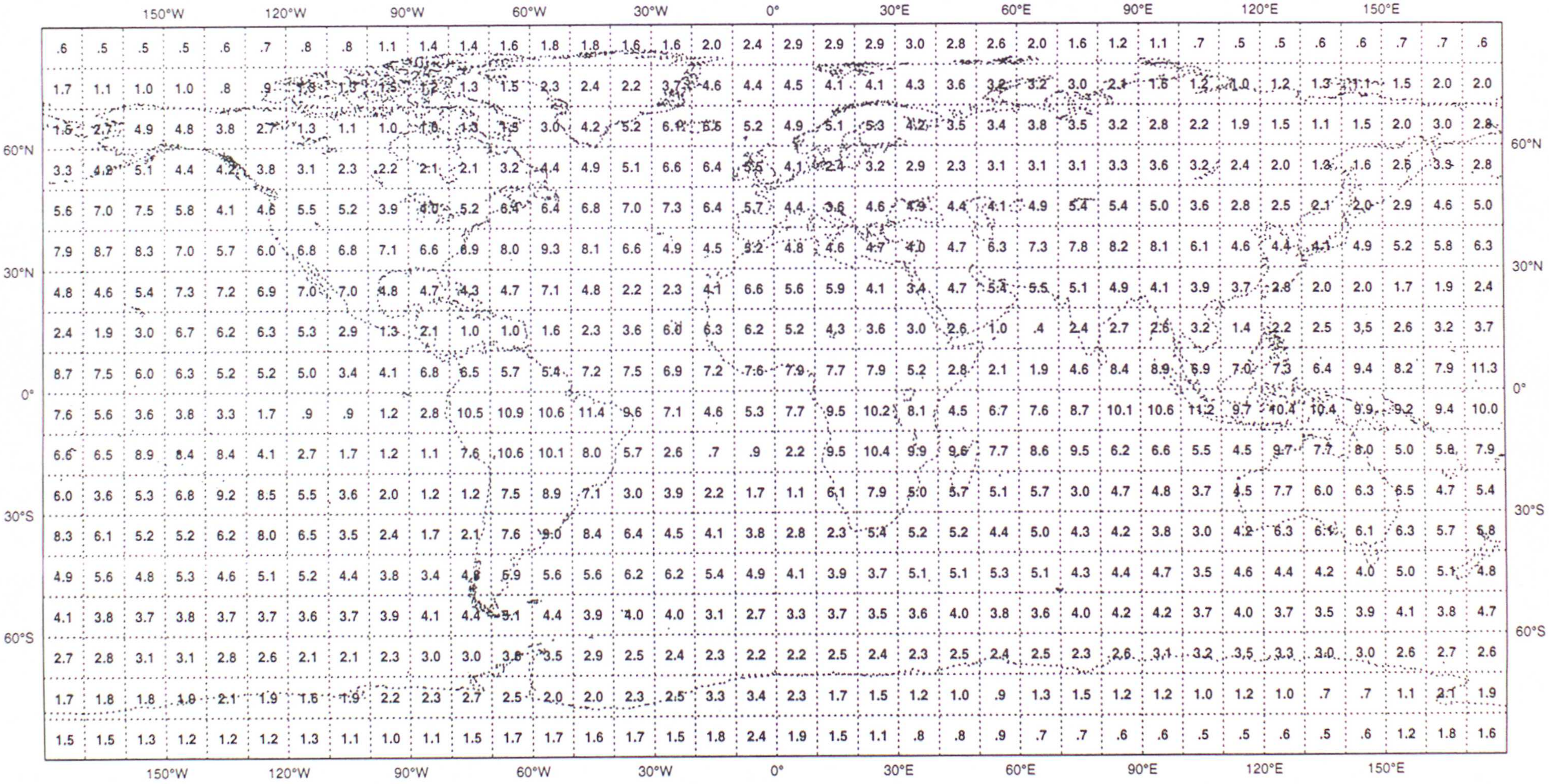
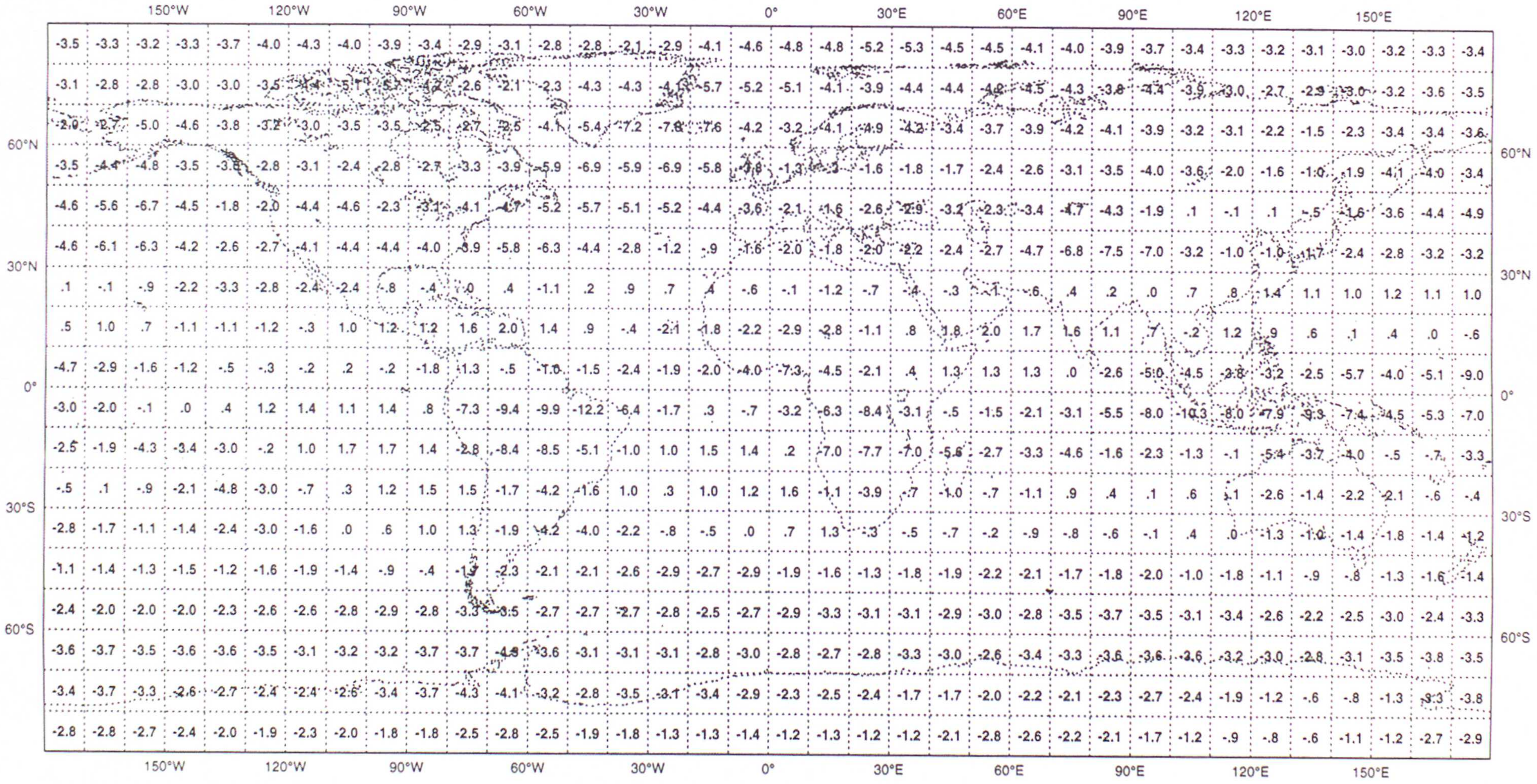

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.8 -.7 -.7 -.7 -.8 -.9 -1.1 -1.0 -1.1 -.9 -.7 -.9 -.8 -.8 -.5 -.9 -1.7 -2.2 -2.4 -2.4 -2.5 -2.5 -2.0 -1.9 -1.6 -1.5 -1.4 -1.2 -.9 -.8 -.7 -.7 -.7 -.8 -.9 -.8
-.7 -.5 -.6 -.6 -.5 -.6 -.8 -1.1 -1.4 -.8 -.4 -.3 -.6 -1.5 -1.4 -2.0 -4.0 -4.2 -4.4 -3.7 -3.4 -3.7 -3.3 -2.7 -2.4 -2.1 -1.6 -1.5 -1.1 -.6 -.6 -.8 -.9 -1.0 -1.1 -.9
-.4 -1.4 -3.3 -2.9 -1.9 -1.2 -.5 -.3 -.2 .0 -.4 -.3 -2.1 -2.7 -5.2 -6.4 -6.5 -4.2 -3.6 -3.6 -3.7 -3.5 -2.6 -2.3 -2.2 -2.2 -2.0 -1.8 -1.2 -1.0 -.5 .0 -.3 -.9 -1.0 -1.4
-3.0 -3.7 -4.5 -3.9 -3.1 -2.1 -2.0 -.7 -.7 -.8 -.8 -1.6 -4.1 -5.8 -5.4 -6.6 -6.4 -4.1 -2.1 -.8 -1.5 -1.5 -1.2 -1.6 -1.7 -2.0 -2.3 -2.3 -2.1 -.8 -.4 -.1 -.9 -2.4 -2.7 -2.8
-4.4 -5.5 -6.8 -5.2 -2.9 -2.7 -3.7 -3.6 -1.8 -2.3 -3.2 -4.1 -4.8 -6.2 -6.2 -5.9 -5.4 -4.3 -2.4 -1.4 -2.3 -3.3 -3.1 -2.7 -3.2 -3.6 -2.7 -.7 .6 -.4 -.5 -.8 -1.3 -2.8 -3.8 -4.6
-6.1 -7.7 -7.4 -5.2 -4.1 -3.9 -4.4 -4.3 -5.0 -4.8 -5.4 -7.9 -8.2 -6.2 -4.5 -3.0 -2.7 -2.2 -2.5 -3.0 -3.0 -2.9 -2.6 -2.7 -4.7 -5.5 -4.9 -4.5 -2.7 -2.3 -2.8 -3.3 -4.2 -4.6 -4.9 -4.8
-2.3 -2.1 -2.7 -4.4 -5.4 -4.9 -4.2 -3.5 -2.5 -2.4 -1.9 -1.7 -2.9 -1.8 -.9 -.9 -1.1 -1.8 -1.0 -1.3 -.6 -.6 -1.4 -2.2 -1.8 -1.2 -1.2 -1.5 -1.2 -2.1 -2.0 -1.3 -1.2 -1.1 -1.1 -1.4
-1.2 -.8 -1.3 -3.5 -3.7 -4.1 -2.8 -.8 -.2 -.9 -.3 -.4 -.6 -1.1 -2.1 -3.6 -3.0 -2.1 -1.8 -1.7 -.2 .1 -.2 -.2 -.1 -.1 -1.0 -1.1 -1.6 -.6 -1.1 -1.5 -1.8 -1.4 -1.6 -1.8
-6.0 -4.3 -3.7 -3.6 -2.7 -2.3 -2.2 -1.6 -1.9 -3.3 -3.9 -2.8 -3.2 -4.3 -4.7 -3.8 -3.5 -4.7 -6.0 -4.8 -3.5 -1.3 .2 -.7 -.7 -1.7 -5.0 -6.1 -5.1 -4.9 -5.2 -4.5 -7.0 -5.3 -5.8 -9.1
-4.3 -2.9 -1.5 -1.6 -1.3 -.7 -.6 -.6 -.6 -1.5 -9.5 -10.3 -11.0 -12.6 -7.6 -3.2 -1.5 -2.2 -4.9 -7.9 -9.0 -3.9 -2.0 -3.1 -3.8 -4.7 -7.2 -9.6 -11.2 -9.0 -8.6 -10.2 -8.3 -5.7 -6.2 -7.4
-3.3 -3.1 -5.6 -5.2 -4.7 -2.1 -1.0 -.7 -.7 -.9 -3.7 -7.6 -9.4 -5.4 -2.7 -.7 -.3 -.3 -1.2 -6.3 -7.7 -7.4 -6.6 -4.0 -4.5 -5.5 -3.0 -3.5 -2.6 -1.8 -5.2 -4.0 -4.7 -1.9 -2.2 -4.2
-2.7 -1.4 -2.6 -4.0 -6.9 -5.0 -2.6 -1.5 -.9 -.9 -.4 -1.3 -5.3 -3.1 -.7 -1.2 -.6 -.4 -.3 -1.6 -4.5 -1.9 -2.4 -2.3 -2.9 -1.3 -2.0 -2.3 -1.5 -1.1 -3.8 -2.2 -3.5 -4.0 -2.5 -2.5
-5.2 -3.8 -3.1 -3.3 -4.1 -4.7 -3.5 -1.6 -1.0 -.7 -.1 -2.0 -5.5 -5.5 -4.2 -2.6 -2.1 -1.8 -1.2 -.6 -1.8 -2.2 -2.3 -1.9 -3.0 -2.8 -2.6 -2.2 -1.6 -1.7 -3.1 -2.7 -2.3 -3.6 -3.4 -3.2
-2.5 -3.1 -3.0 -3.5 -2.8 -3.2 -3.4 -3.0 -2.5 -2.2 -2.8 -2.8 -3.1 -3.1 -3.7 -4.0 -3.9 -3.9 -2.9 -2.8 -2.6 -2.9 -3.0 -3.4 -3.4 -3.0 -3.0 -3.4 -2.3 -3.1 -2.7 -2.3 -2.2 -2.7 -3.6 -2.5
-3.3 -2.9 -3.0 -2.8 -3.0 -3.3 -3.2 -3.3 -3.3 -3.2 -3.8 -3.9 -3.1 -2.9 -2.8 -2.8 -2.4 -2.7 -2.7 -3.0 -2.8 -2.9 -2.7 -2.7 -2.6 -3.2 -3.5 -3.5 -3.2 -3.7 -3.1 -2.6 -2.8 -3.4 -3.0 -3.8
-2.9 -2.8 -2.7 -2.7 -2.8 -2.9 -2.5 -2.3 -2.3 -2.7 -2.7 -3.2 -2.6 -2.3 -2.3 -2.3 -2.4 -2.8 -2.4 -2.1 -2.2 -2.3 -2.0 -1.5 -2.3 -2.5 -2.6 -2.6 -2.8 -2.7 -2.2 -1.9 -2.2 -2.5 -2.9 -2.8
-2.0 -2.1 -1.8 -1.2 -1.1 -1.1 -1.1 -1.2 -1.7 -1.8 -2.2 -2.1 -1.9 -1.7 -2.2 -1.9 -2.0 -1.6 -1.1 -.9 -.8 -.4 -.3 -.4 -.7 -.8 -.8 -1.0 -.8 -.6 -.2 .1 .1 -.1 -1.3 -2.1
-.7 -.8 -.7 -.4 -.1 -.1 -.4 -.2 -.1 -.1 -.5 -.7 -.6 -.3 -.2 .0 -.1 -.3 -.2 -.2 -.2 -.1 -.4 -.6 -.5 -.4 -.4 -.2 -.1 .1 .2 .3 .2 .1 -.8 -.8

Figure 59. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



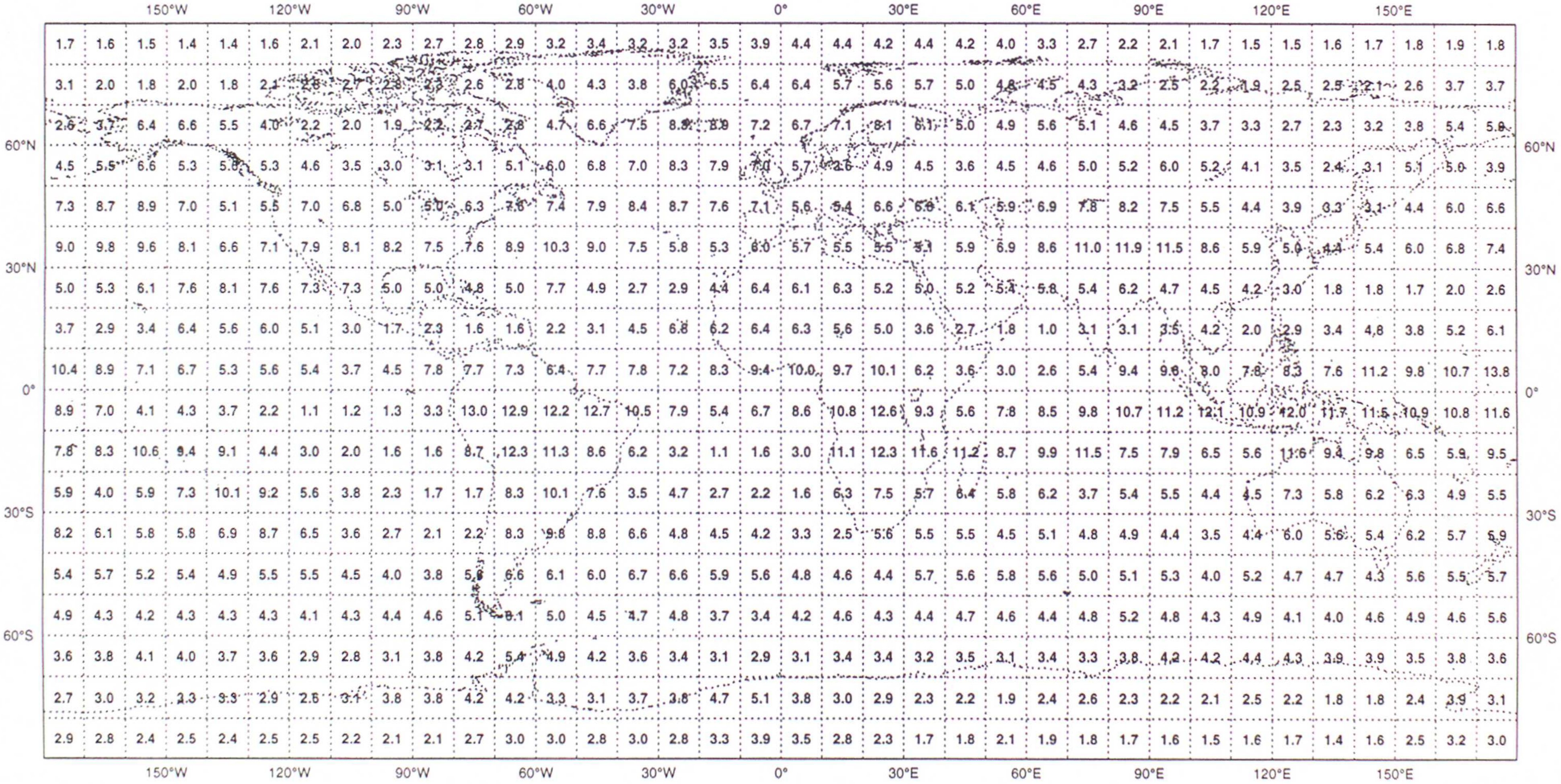
.6	.5	.5	.5	.6	.7	.8	.8	1.1	1.4	1.4	1.6	1.8	1.8	1.6	1.6	2.0	2.4	2.9	2.9	2.9	3.0	2.8	2.6	2.0	1.6	1.2	1.1	.7	.5	.5	.6	.6	.7	.7	.6
1.7	1.1	1.0	1.0	.8	.9	1.8	1.3	1.5	1.2	1.3	1.5	2.3	2.4	2.2	3.7	4.6	4.4	4.5	4.1	4.1	4.3	3.6	3.2	3.2	3.0	2.1	1.6	1.2	1.0	1.2	1.3	1.1	1.5	2.0	2.0
1.5	2.7	4.9	4.8	3.8	2.7	1.3	1.1	1.0	1.0	1.3	1.5	3.0	4.2	5.2	6.1	5.5	5.2	4.9	5.1	5.3	4.2	3.5	3.4	3.8	3.5	3.2	2.8	2.2	1.9	1.5	1.1	1.5	2.0	3.0	2.8
3.3	4.2	5.1	4.4	4.2	3.8	3.1	2.3	2.2	2.1	2.1	3.2	4.4	4.9	5.1	6.6	6.4	5.5	4.1	2.4	3.2	2.9	2.3	3.1	3.1	3.1	3.3	3.6	3.2	2.4	2.0	1.8	1.6	2.5	3.3	2.8
5.6	7.0	7.5	5.8	4.1	4.6	5.5	5.2	3.9	4.0	5.2	6.4	6.4	6.8	7.0	7.3	6.4	5.7	4.4	3.6	4.6	4.9	4.4	4.1	4.9	5.4	5.4	5.0	3.6	2.8	2.5	2.1	2.0	2.9	4.6	5.0
7.9	8.7	8.3	7.0	5.7	6.0	6.8	6.8	7.1	6.6	6.9	8.0	9.3	8.1	6.6	4.9	4.5	5.2	4.8	4.6	4.7	4.0	4.7	6.3	7.3	7.8	8.2	8.1	6.1	4.6	4.4	4.1	4.9	5.2	5.8	6.3
4.8	4.6	5.4	7.3	7.2	6.9	7.0	7.0	4.8	4.7	4.3	4.7	7.1	4.8	2.2	2.3	4.1	6.6	5.6	5.9	4.1	3.4	4.7	5.4	5.5	5.1	4.9	4.1	3.9	3.7	2.8	2.0	2.0	1.7	1.9	2.4
2.4	1.9	3.0	6.7	6.2	6.3	5.3	2.9	1.3	2.1	1.0	1.0	1.6	2.3	3.6	6.0	6.3	6.2	5.2	4.3	3.6	3.0	2.6	1.0	.4	2.4	2.7	2.6	3.2	1.4	2.2	2.5	3.5	2.6	3.2	3.7
8.7	7.5	6.0	6.3	5.2	5.2	5.0	3.4	4.1	6.8	6.5	5.7	5.4	7.2	7.5	6.9	7.2	7.6	7.9	7.7	7.9	5.2	2.8	2.1	1.9	4.6	8.4	8.9	6.9	7.0	7.3	6.4	9.4	8.2	7.9	11.3
7.6	5.6	3.6	3.8	3.3	1.7	.9	.9	1.2	2.8	10.5	10.9	10.6	11.4	9.6	7.1	4.6	5.3	7.7	9.5	10.2	8.1	4.5	6.7	7.6	8.7	10.1	10.6	11.2	9.7	10.4	10.4	9.9	9.2	9.4	10.0
6.6	6.5	8.9	8.4	8.4	4.1	2.7	1.7	1.2	1.1	7.6	10.6	10.1	8.0	5.7	2.6	.7	.9	2.2	9.5	10.4	9.9	9.6	7.7	8.6	9.5	6.2	6.6	5.5	4.5	9.7	7.7	8.0	5.0	5.8	7.9
6.0	3.6	5.3	6.8	9.2	8.5	5.5	3.6	2.0	1.2	1.2	7.5	8.9	7.1	3.0	3.9	2.2	1.7	1.1	6.1	7.9	5.0	5.7	5.1	5.7	3.0	4.7	4.8	3.7	4.5	7.7	6.0	6.3	6.5	4.7	5.4
8.3	6.1	5.2	5.2	6.2	8.0	6.5	3.5	2.4	1.7	2.1	7.6	9.0	8.4	6.4	4.5	4.1	3.8	2.8	2.3	5.4	5.2	5.2	4.4	5.0	4.3	4.2	3.8	3.0	4.2	6.3	6.1	6.1	6.3	5.7	5.8
4.9	5.6	4.8	5.3	4.6	5.1	5.2	4.4	3.8	3.4	4.8	5.9	5.6	5.6	6.2	6.2	5.4	4.9	4.1	3.9	3.7	5.1	5.1	5.3	5.1	4.3	4.4	4.7	3.5	4.6	4.4	4.2	4.0	5.0	5.1	4.8
4.1	3.8	3.7	3.8	3.7	3.7	3.6	3.7	3.9	4.1	4.4	5.1	4.4	3.9	4.0	4.0	3.1	2.7	3.3	3.7	3.5	3.6	4.0	3.8	3.6	4.0	4.2	4.2	3.7	4.0	3.7	3.5	3.9	4.1	3.8	4.7
2.7	2.8	3.1	3.1	2.8	2.6	2.1	2.1	2.3	3.0	3.0	3.6	3.5	2.9	2.5	2.4	2.3	2.2	2.2	2.5	2.4	2.3	2.5	2.4	2.5	2.3	2.6	3.1	3.2	3.5	3.3	3.0	3.0	2.6	2.7	2.6
1.7	1.8	1.8	1.9	2.1	1.9	1.6	1.9	2.2	2.3	2.7	2.5	2.0	2.0	2.3	2.5	3.3	3.4	2.3	1.7	1.5	1.2	1.0	.9	1.3	1.5	1.2	1.2	1.0	1.2	1.0	.7	.7	1.1	2.1	1.9
1.5	1.5	1.3	1.2	1.2	1.2	1.3	1.1	1.0	1.1	1.5	1.7	1.7	1.6	1.7	1.5	1.8	2.4	1.9	1.5	1.1	.8	.8	.9	.7	.7	.6	.6	.5	.5	.6	.5	.6	1.2	1.8	1.6

Figure 60. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



-3.5	-3.3	-3.2	-3.3	-3.7	-4.0	-4.3	-4.0	-3.9	-3.4	-2.9	-3.1	-2.8	-2.8	-2.1	-2.9	-4.1	-4.6	-4.8	-4.8	-5.2	-5.3	-4.5	-4.5	-4.1	-4.0	-3.9	-3.7	-3.4	-3.3	-3.2	-3.1	-3.0	-3.2	-3.3	-3.4
-3.1	-2.8	-2.8	-3.0	-3.0	-3.5	-4.4	-5.1	-5.7	-4.2	-2.6	-2.1	-2.3	-4.3	-4.3	-4.1	-5.7	-5.2	-5.1	-4.1	-3.9	-4.4	-4.4	-4.2	-4.5	-4.3	-3.8	-4.4	-3.9	-3.0	-2.7	-2.9	-3.0	-3.2	-3.6	-3.5
-2.9	-2.7	-5.0	-4.6	-3.8	-3.2	-3.0	-3.5	-3.5	-2.5	-2.7	-2.5	-4.1	-5.4	-7.2	-7.8	-7.6	-4.2	-3.2	-4.1	-4.9	-4.2	-3.4	-3.7	-3.9	-4.2	-4.1	-3.9	-3.2	-3.1	-2.2	-1.5	-2.3	-3.4	-3.4	-3.6
-3.5	-4.4	-4.8	-3.5	-3.8	-2.8	-3.1	-2.4	-2.8	-2.7	-3.3	-3.9	-5.9	-6.9	-5.9	-6.9	-5.8	-3.8	-1.3	-.3	-1.6	-1.8	-1.7	-2.4	-2.6	-3.1	-3.5	-4.0	-3.6	-2.0	-1.6	-1.0	-1.9	-4.1	-4.0	-3.4
-4.6	-5.6	-6.7	-4.5	-1.8	-2.0	-4.4	-4.6	-2.3	-3.1	-4.1	-4.7	-5.2	-5.7	-5.1	-5.2	-4.4	-3.6	-2.1	-1.6	-2.6	-2.9	-3.2	-2.3	-3.4	-4.7	-4.3	-1.9	.1	-.1	.1	-.5	-1.6	-3.6	-4.4	-4.9
-4.6	-6.1	-6.3	-4.2	-2.6	-2.7	-4.1	-4.4	-4.4	-4.0	-3.9	-5.8	-6.3	-4.4	-2.8	-1.2	-.9	-1.6	-2.0	-1.8	-2.0	-2.2	-2.4	-2.7	-4.7	-6.8	-7.5	-7.0	-3.2	-1.0	-1.0	-1.7	-2.4	-2.8	-3.2	-3.2
.1	-.1	-.9	-2.2	-3.3	-2.8	-2.4	-2.4	-.8	-.4	.0	.4	-1.1	.2	.9	.7	.4	-.6	-.1	-1.2	-.7	-.4	-.3	-.1	-.6	.4	.2	.0	.7	.8	1.4	1.1	1.0	1.2	1.1	1.0
.5	1.0	.7	-1.1	-1.1	-1.2	-.3	1.0	1.2	1.2	1.6	2.0	1.4	.9	-.4	-2.1	-1.8	-2.2	-2.9	-2.8	-1.1	.8	1.8	2.0	1.7	1.6	1.1	.7	-.2	1.2	.9	.6	.1	.4	.0	-.6
-4.7	-2.9	-1.6	-1.2	-.5	-.3	-.2	.2	-.2	-1.8	1.3	-.5	-1.0	-1.5	-2.4	-1.9	-2.0	-4.0	-7.3	-4.5	-2.1	.4	1.3	1.3	1.3	.0	-2.6	-5.0	-4.5	-3.8	-3.2	-2.5	-5.7	-4.0	-5.1	-9.0
-3.0	-2.0	-.1	.0	.4	1.2	1.4	1.1	1.4	.8	-7.3	-9.4	-9.9	-12.2	-6.4	-1.7	.3	-.7	-3.2	-6.3	-8.4	-3.1	-.5	-1.5	-2.1	-3.1	-5.5	-8.0	-10.3	-8.0	-7.9	-9.3	-7.4	-4.5	-5.3	-7.0
-2.5	-1.9	-4.3	-3.4	-3.0	-.2	1.0	1.7	1.7	1.4	-2.8	-8.4	-8.5	-5.1	-1.0	1.0	1.5	1.4	.2	-7.0	-7.7	-7.0	-5.6	-2.7	-3.3	-4.6	-1.6	-2.3	-1.3	-.1	-5.4	-3.7	-4.0	-.5	-.7	-3.3
-.5	.1	-.9	-2.1	-4.8	-3.0	-.7	.3	1.2	1.5	1.5	-1.7	-4.2	-1.6	1.0	.3	1.0	1.2	1.6	-1.1	-3.9	-.7	-1.0	-.7	-1.1	.9	.4	.1	.6	.1	-2.6	-1.4	-2.2	-2.1	-.6	-.4
-2.8	-1.7	-1.1	-1.4	-2.4	-3.0	-1.6	.0	.6	1.0	1.3	-1.9	-4.2	-4.0	-2.2	-.8	-.5	.0	.7	1.3	-.3	-.5	-.7	-.2	-.9	-.8	-.6	-.1	.4	.0	-1.3	-1.0	-1.4	-1.8	-1.4	-1.2
-1.1	-1.4	-1.3	-1.5	-1.2	-1.6	-1.9	-1.4	-.9	-.4	-1.7	-2.3	-2.1	-2.1	-2.6	-2.9	-2.7	-2.9	-1.9	-1.6	-1.3	-1.8	-1.9	-2.2	-2.1	-1.7	-1.8	-2.0	-1.0	-1.8	-1.1	-.9	-.8	-1.3	-1.6	-1.4
-2.4	-2.0	-2.0	-2.0	-2.3	-2.6	-2.6	-2.8	-2.9	-2.8	-3.3	-3.5	-2.7	-2.7	-2.7	-2.8	-2.5	-2.7	-2.9	-3.3	-3.1	-3.1	-2.9	-3.0	-2.8	-3.5	-3.7	-3.5	-3.1	-3.4	-2.6	-2.2	-2.5	-3.0	-2.4	-3.3
-3.6	-3.7	-3.5	-3.6	-3.6	-3.5	-3.1	-3.2	-3.2	-3.7	-3.7	-4.8	-3.6	-3.1	-3.1	-3.1	-2.8	-3.0	-2.8	-2.7	-2.8	-3.3	-3.0	-2.6	-3.4	-3.3	-3.6	-3.6	-3.6	-3.2	-3.0	-2.8	-3.1	-3.5	-3.8	-3.5
-3.4	-3.7	-3.3	-2.6	-2.7	-2.4	-2.4	-2.6	-3.4	-3.7	-4.3	-4.1	-3.2	-2.8	-3.5	-3.1	-3.4	-2.9	-2.3	-2.5	-2.4	-1.7	-1.7	-2.0	-2.2	-2.1	-2.3	-2.7	-2.4	-1.9	-1.2	-.6	-.8	-1.3	-3.3	-3.8
-2.8	-2.8	-2.7	-2.4	-2.0	-1.9	-2.3	-2.0	-1.8	-1.8	-2.5	-2.8	-2.5	-1.9	-1.8	-1.3	-1.3	-1.4	-1.2	-1.3	-1.2	-1.2	-2.1	-2.8	-2.6	-2.2	-2.1	-1.7	-1.2	-.9	-.8	-.6	-1.1	-1.2	-2.7	-2.9

Figure 61. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



1.7	1.6	1.5	1.4	1.4	1.6	2.1	2.0	2.3	2.7	2.8	2.9	3.2	3.4	3.2	3.2	3.5	3.9	4.4	4.4	4.2	4.4	4.2	4.0	3.3	2.7	2.2	2.1	1.7	1.5	1.5	1.6	1.7	1.8	1.9	1.8
3.1	2.0	1.8	2.0	1.8	2.1	2.8	2.7	2.8	2.3	2.6	2.8	4.0	4.3	3.8	6.0	6.5	6.4	6.4	5.7	5.6	5.7	5.0	4.8	4.5	4.3	3.2	2.5	2.2	1.9	2.5	2.5	2.1	2.6	3.7	3.7
2.6	3.7	6.4	6.6	5.5	4.0	2.2	2.0	1.9	2.2	2.7	2.8	4.7	6.6	7.5	8.9	8.9	7.2	6.7	7.1	8.1	6.1	5.0	4.9	5.6	5.1	4.6	4.5	3.7	3.3	2.7	2.3	3.2	3.8	5.4	5.8
4.5	5.5	6.6	5.3	5.8	5.3	4.6	3.5	3.0	3.1	3.1	5.1	6.0	6.8	7.0	8.3	7.9	7.0	5.7	2.6	4.9	4.5	3.6	4.5	4.6	5.0	5.2	6.0	5.2	4.1	3.5	2.4	3.1	5.1	5.0	3.9
7.3	8.7	8.9	7.0	5.1	5.5	7.0	6.8	5.0	5.0	6.3	7.6	7.4	7.9	8.4	8.7	7.6	7.1	5.6	5.4	6.6	6.8	6.1	5.9	6.9	7.8	8.2	7.5	5.5	4.4	3.9	3.3	3.1	4.4	6.0	6.6
9.0	9.8	9.6	8.1	6.6	7.1	7.9	8.1	8.2	7.5	7.6	8.9	10.3	9.0	7.5	5.8	5.3	8.0	5.7	5.5	5.5	5.1	5.9	6.9	8.6	11.0	11.9	11.5	8.6	5.9	5.0	4.4	5.4	6.0	6.8	7.4
5.0	5.3	6.1	7.6	8.1	7.6	7.3	7.3	5.0	5.0	4.8	5.0	7.7	4.9	2.7	2.9	4.4	6.4	6.1	6.3	5.2	5.0	5.2	5.4	5.8	5.4	6.2	4.7	4.5	4.2	3.0	1.8	1.8	1.7	2.0	2.6
3.7	2.9	3.4	6.4	5.6	6.0	5.1	3.0	1.7	2.3	1.6	1.6	2.2	3.1	4.5	6.8	6.2	6.4	6.3	5.6	5.0	3.6	2.7	1.8	1.0	3.1	3.1	3.5	4.2	2.0	2.9	3.4	4.8	3.8	5.2	6.1
10.4	8.9	7.1	6.7	5.3	5.6	5.4	3.7	4.5	7.8	7.7	7.3	6.4	7.7	7.8	7.2	8.3	9.4	10.0	9.7	10.1	6.2	3.6	3.0	2.6	5.4	9.4	9.6	8.0	7.8	8.3	7.6	11.2	9.8	10.7	13.8
8.9	7.0	4.1	4.3	3.7	2.2	1.1	1.2	1.3	3.3	13.0	12.9	12.2	12.7	10.5	7.9	5.4	6.7	8.6	10.8	12.6	9.3	5.6	7.8	8.5	9.8	10.7	11.2	12.1	10.9	12.0	11.7	11.5	10.9	10.8	11.6
7.8	8.3	10.6	9.4	9.1	4.4	3.0	2.0	1.6	1.6	8.7	12.3	11.3	8.6	6.2	3.2	1.1	1.6	3.0	11.1	12.3	11.6	11.2	8.7	9.9	11.5	7.5	7.9	6.5	5.6	11.6	9.4	9.8	6.5	5.9	9.5
5.9	4.0	5.9	7.3	10.1	9.2	5.6	3.8	2.3	1.7	1.7	8.3	10.1	7.6	3.5	4.7	2.7	2.2	1.6	6.3	7.5	5.7	6.4	5.8	6.2	3.7	5.4	5.5	4.4	4.5	7.3	5.8	6.2	6.3	4.9	5.5
8.2	6.1	5.8	5.8	6.9	8.7	6.5	3.6	2.7	2.1	2.2	8.3	9.8	8.8	6.6	4.8	4.5	4.2	3.3	2.5	5.6	5.5	5.5	4.5	5.1	4.8	4.9	4.4	3.5	4.4	6.0	5.6	5.4	6.2	5.7	5.9
5.4	5.7	5.2	5.4	4.9	5.5	5.5	4.5	4.0	3.8	5.6	6.6	6.1	6.0	6.7	6.6	5.9	5.6	4.8	4.6	4.4	5.7	5.6	5.8	5.6	5.0	5.1	5.3	4.0	5.2	4.7	4.7	4.3	5.6	5.5	5.7
4.9	4.3	4.2	4.3	4.3	4.3	4.1	4.3	4.4	4.6	5.1	8.1	5.0	4.5	4.7	4.8	3.7	3.4	4.2	4.6	4.3	4.4	4.7	4.6	4.4	4.8	5.2	4.8	4.3	4.9	4.1	4.0	4.6	4.9	4.6	5.6
3.6	3.8	4.1	4.0	3.7	3.6	2.9	2.8	3.1	3.8	4.2	5.4	4.9	4.2	3.6	3.4	3.1	2.9	3.1	3.4	3.4	3.2	3.5	3.1	3.4	3.3	3.8	4.2	4.2	4.4	4.3	3.9	3.9	3.5	3.8	3.6
2.7	3.0	3.2	2.3	3.3	2.9	2.6	3.1	3.8	3.8	4.2	4.2	3.3	3.1	3.7	3.8	4.7	5.1	3.8	3.0	2.9	2.3	2.2	1.9	2.4	2.6	2.3	2.2	2.1	2.5	2.2	1.8	1.8	2.4	3.9	3.1
2.9	2.8	2.4	2.5	2.4	2.5	2.5	2.2	2.1	2.1	2.7	3.0	3.0	2.8	3.0	2.8	3.3	3.9	3.5	2.8	2.3	1.7	1.8	2.1	1.9	1.8	1.7	1.6	1.5	1.6	1.7	1.4	1.6	2.5	3.2	3.0

Figure 62. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations

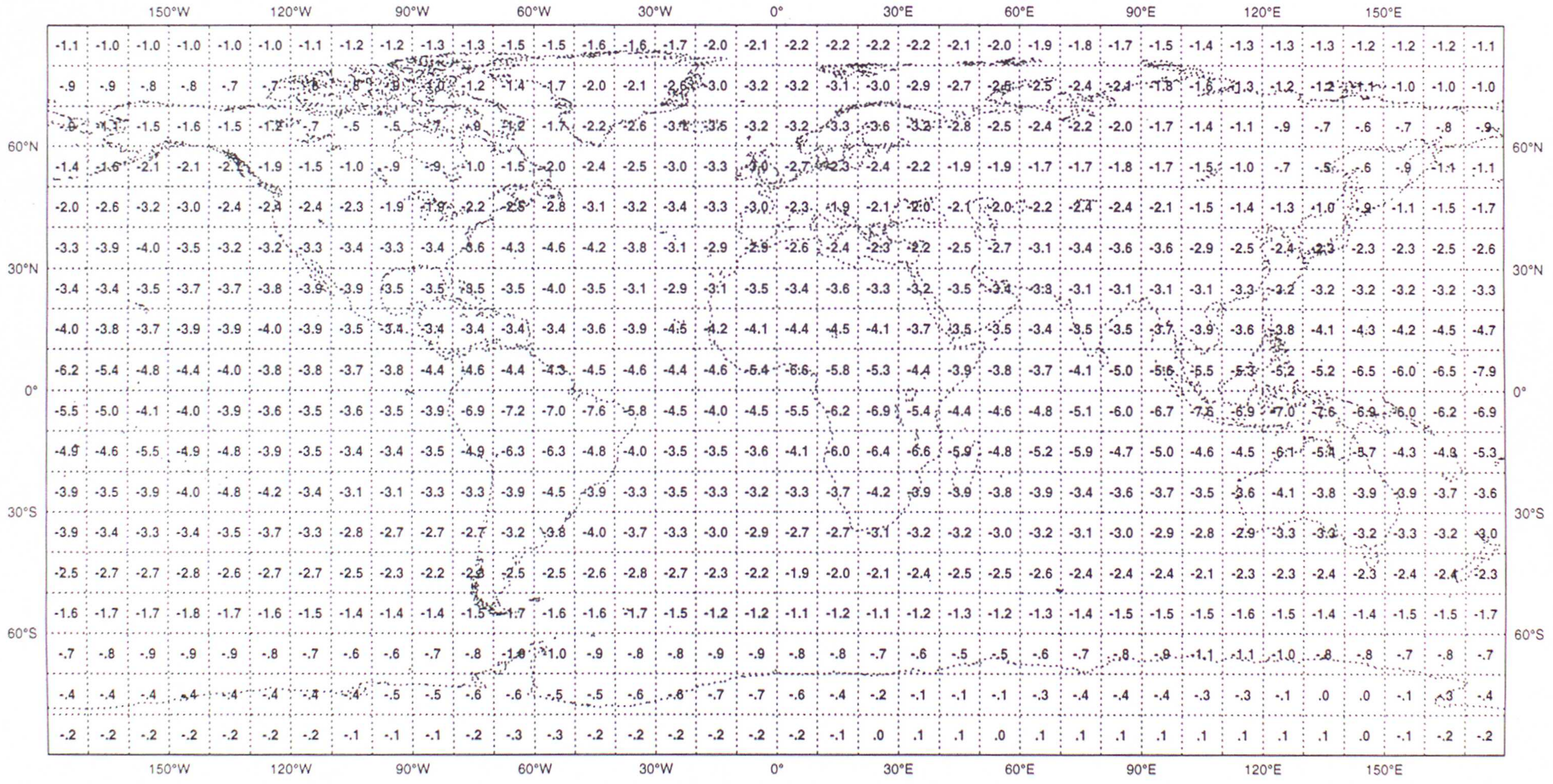

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-1.1 -1.0 -1.0 -1.0 -1.0 -1.0 -1.1 -1.2 -1.2 -1.3 -1.3 -1.5 -1.5 -1.6 -1.6 -1.7 -2.0 -2.1 -2.2 -2.2 -2.2 -2.2 -2.1 -2.0 -1.9 -1.8 -1.7 -1.5 -1.4 -1.3 -1.3 -1.3 -1.2 -1.2 -1.2 -1.1
-.9 -.9 -.8 -.8 -.7 -.7 -.8 -.8 -.9 -1.0 -1.2 -1.4 -1.7 -2.0 -2.1 -2.6 -3.0 -3.2 -3.2 -3.1 -3.0 -2.9 -2.7 -2.6 -2.5 -2.4 -2.4 -1.8 -1.6 -1.3 -1.2 -1.2 -1.1 -1.0 -1.0 -1.0
-.8 -1.1 -1.5 -1.6 -1.5 -1.2 -.7 -.5 -.5 -.7 -.9 -1.2 -1.7 -2.2 -2.6 -3.1 -3.5 -3.2 -3.2 -3.3 -3.6 -3.2 -2.8 -2.5 -2.4 -2.2 -2.0 -1.7 -1.4 -1.1 -.9 -.7 -.6 -.7 -.8 -.9
-1.4 -1.6 -2.1 -2.1 -2.1 -1.9 -1.5 -1.0 -.9 -.9 -1.0 -1.5 -2.0 -2.4 -2.5 -3.0 -3.3 -3.0 -2.7 -2.3 -2.4 -2.2 -1.9 -1.9 -1.7 -1.7 -1.8 -1.7 -1.5 -1.0 -.7 -.5 -.6 -.9 -1.1 -1.1
-2.0 -2.6 -3.2 -3.0 -2.4 -2.4 -2.4 -2.3 -1.9 -1.9 -2.2 -2.6 -2.8 -3.1 -3.2 -3.4 -3.3 -3.0 -2.3 -1.9 -2.1 -2.0 -2.1 -2.0 -2.2 -2.4 -2.4 -2.1 -1.5 -1.4 -1.3 -1.0 -.9 -1.1 -1.5 -1.7
-3.3 -3.9 -4.0 -3.5 -3.2 -3.2 -3.3 -3.4 -3.3 -3.4 -3.6 -4.3 -4.6 -4.2 -3.8 -3.1 -2.9 -2.9 -2.6 -2.4 -2.3 -2.2 -2.5 -2.7 -3.1 -3.4 -3.6 -3.6 -2.9 -2.5 -2.4 -2.3 -2.3 -2.3 -2.5 -2.6
-3.4 -3.4 -3.5 -3.7 -3.7 -3.8 -3.9 -3.9 -3.5 -3.5 -3.5 -3.5 -4.0 -3.5 -3.1 -2.9 -3.1 -3.5 -3.4 -3.6 -3.3 -3.2 -3.5 -3.4 -3.3 -3.1 -3.1 -3.1 -3.1 -3.3 -3.2 -3.2 -3.2 -3.2 -3.2 -3.3
-4.0 -3.8 -3.7 -3.9 -3.9 -4.0 -3.9 -3.5 -3.4 -3.4 -3.4 -3.4 -3.4 -3.6 -3.9 -4.5 -4.2 -4.1 -4.4 -4.5 -4.1 -3.7 -3.5 -3.5 -3.4 -3.5 -3.5 -3.7 -3.9 -3.6 -3.8 -4.1 -4.3 -4.2 -4.5 -4.7
-6.2 -5.4 -4.8 -4.4 -4.0 -3.8 -3.8 -3.7 -3.8 -4.4 -4.6 -4.4 -4.3 -4.5 -4.6 -4.4 -4.6 -5.4 -6.6 -5.8 -5.3 -4.4 -3.9 -3.8 -3.7 -4.1 -5.0 -5.6 -5.5 -5.3 -5.2 -5.2 -6.5 -6.0 -6.5 -7.9
-5.5 -5.0 -4.1 -4.0 -3.9 -3.6 -3.5 -3.6 -3.5 -3.9 -6.9 -7.2 -7.0 -7.6 -5.8 -4.5 -4.0 -4.5 -5.5 -6.2 -6.9 -5.4 -4.4 -4.6 -4.8 -5.1 -6.0 -6.7 -7.5 -6.9 -7.0 -7.6 -6.9 -6.0 -6.2 -6.9
-4.9 -4.6 -5.5 -4.9 -4.8 -3.9 -3.5 -3.4 -3.4 -3.5 -4.9 -6.3 -6.3 -4.8 -4.0 -3.5 -3.5 -3.6 -4.1 -6.0 -6.4 -6.6 -5.9 -4.8 -5.2 -5.9 -4.7 -5.0 -4.6 -4.5 -6.1 -5.4 -3.7 -4.3 -4.3 -5.3
-3.9 -3.5 -3.9 -4.0 -4.8 -4.2 -3.4 -3.1 -3.1 -3.3 -3.3 -3.9 -4.5 -3.9 -3.3 -3.5 -3.3 -3.2 -3.3 -3.7 -4.2 -3.9 -3.9 -3.8 -3.9 -3.4 -3.6 -3.7 -3.5 -3.6 -4.1 -3.8 -3.9 -3.9 -3.7 -3.6
-3.9 -3.4 -3.3 -3.4 -3.5 -3.7 -3.3 -2.8 -2.7 -2.7 -2.7 -3.2 -3.8 -4.0 -3.7 -3.3 -3.0 -2.9 -2.7 -2.7 -3.1 -3.2 -3.2 -3.0 -3.2 -3.1 -3.0 -2.9 -2.8 -2.9 -3.3 -3.3 -3.2 -3.3 -3.2 -3.0
-2.5 -2.7 -2.7 -2.8 -2.6 -2.7 -2.7 -2.5 -2.3 -2.2 -2.3 -2.5 -2.5 -2.6 -2.8 -2.7 -2.3 -2.2 -1.9 -2.0 -2.1 -2.4 -2.5 -2.5 -2.6 -2.4 -2.4 -2.4 -2.1 -2.3 -2.3 -2.4 -2.3 -2.4 -2.4 -2.3
-1.6 -1.7 -1.7 -1.8 -1.7 -1.6 -1.5 -1.4 -1.4 -1.4 -1.5 -1.7 -1.6 -1.6 -1.7 -1.5 -1.2 -1.2 -1.1 -1.2 -1.1 -1.2 -1.3 -1.2 -1.3 -1.4 -1.5 -1.5 -1.5 -1.6 -1.5 -1.4 -1.4 -1.5 -1.5 -1.7
-.7 -.8 -.9 -.9 -.9 -.8 -.7 -.6 -.6 -.7 -.8 -1.0 -1.0 -.9 -.8 -.8 -.9 -.9 -.8 -.8 -.7 -.6 -.5 -.5 -.6 -.7 -.8 -.9 -1.1 -1.1 -1.0 -.8 -.8 -.7 -.8 -.7
-.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.5 -.5 -.6 -.6 -.5 -.5 -.6 -.8 -.7 -.7 -.6 -.4 -.2 -.1 -.1 -.1 -.3 -.4 -.4 -.4 -.3 -.3 -.1 .0 .0 -.1 -.3 -.4
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.1 -.1 -.2 -.3 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.1 .0 .1 .1 .0 .1 .1 .1 .1 .1 .1 .1 .1 .0 -.1 -.2 -.2

Figure 63. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations

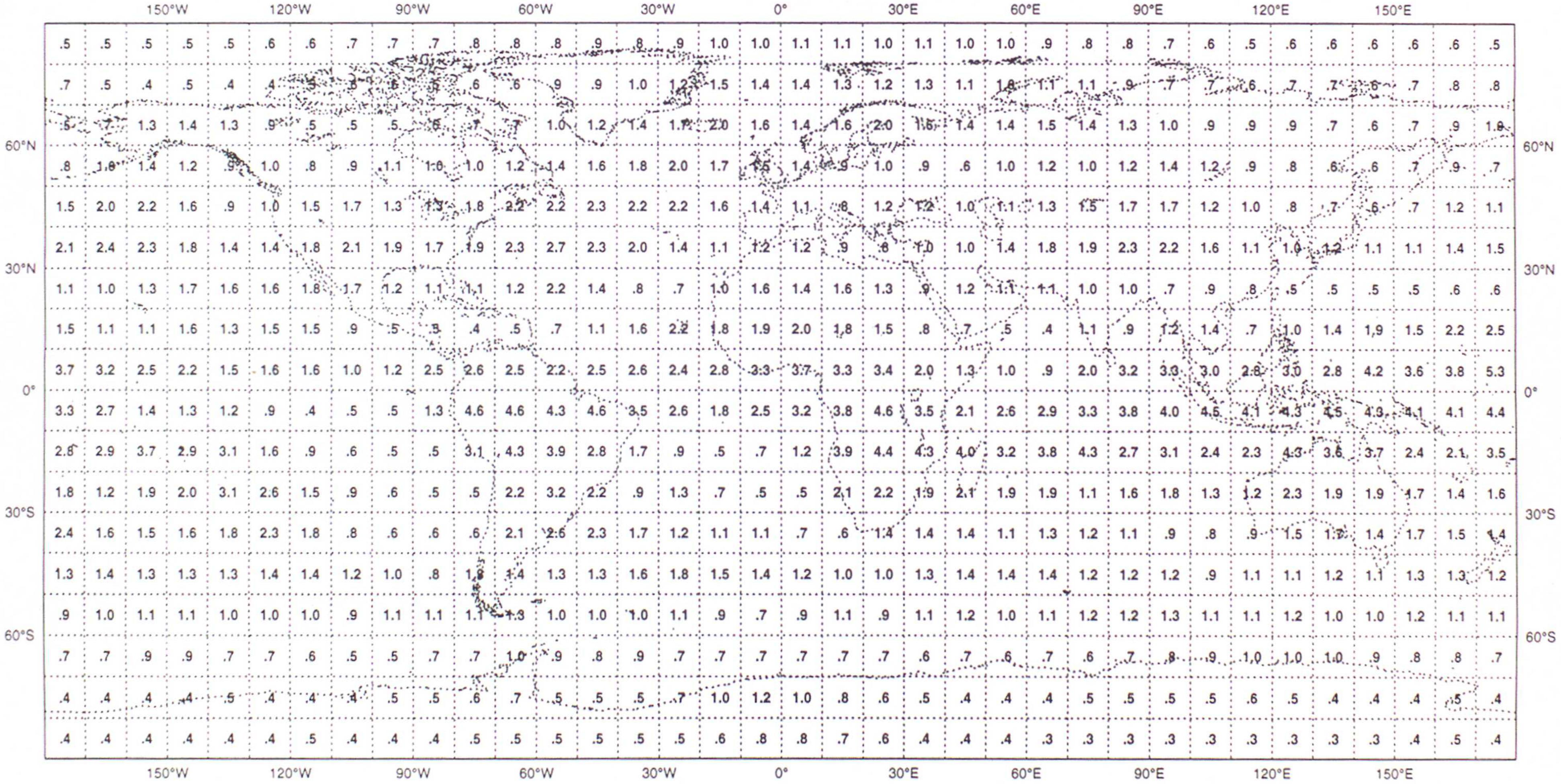

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.5 .5 .5 .5 .5 .6 .6 .7 .7 .7 .8 .8 .8 .9 .8 .9 1.0 1.0 1.1 1.1 1.0 1.1 1.0 1.0 .9 .8 .8 .7 .6 .5 .6 .6 .6 .6 .6 .5
.7 .5 .4 .5 .4 .4 .5 .5 .6 .5 .6 .6 .9 .9 1.0 1.2 1.5 1.4 1.4 1.3 1.2 1.3 1.1 1.8 1.1 1.1 .9 .7 .7 .6 .7 .7 .6 .7 .8 .8
.5 .7 1.3 1.4 1.3 .9 .5 .5 .5 .6 .7 .7 1.0 1.2 1.4 1.7 2.0 1.6 1.4 1.6 2.0 1.6 1.4 1.4 1.5 1.4 1.3 1.0 .9 .9 .9 .7 .6 .7 .9 1.8
.8 1.8 1.4 1.2 .9 1.0 .8 .9 1.1 1.0 1.0 1.2 1.4 1.6 1.8 2.0 1.7 1.5 1.4 .9 1.0 .9 .6 1.0 1.2 1.0 1.2 1.4 1.2 .9 .8 .6 .6 .7 .9 .7
1.5 2.0 2.2 1.6 .9 1.0 1.5 1.7 1.3 1.3 1.8 2.2 2.2 2.3 2.2 2.2 1.6 1.4 1.1 .8 1.2 1.2 1.0 1.1 1.3 1.5 1.7 1.7 1.2 1.0 .8 .7 .6 .7 1.2 1.1
2.1 2.4 2.3 1.8 1.4 1.4 1.8 2.1 1.9 1.7 1.9 2.3 2.7 2.3 2.0 1.4 1.1 1.2 1.2 .9 .8 1.0 1.0 1.4 1.8 1.9 2.3 2.2 1.6 1.1 1.0 1.2 1.1 1.1 1.4 1.5
1.1 1.0 1.3 1.7 1.6 1.6 1.8 1.7 1.2 1.1 1.1 1.2 2.2 1.4 .8 .7 1.0 1.6 1.4 1.6 1.3 .9 1.2 1.1 1.1 1.0 1.0 .7 .9 .8 .5 .5 .5 .5 .6 .6
1.5 1.1 1.1 1.6 1.3 1.5 1.5 .9 .5 .3 .4 .5 .7 1.1 1.6 2.2 1.8 1.9 2.0 1.8 1.5 .8 .7 .5 .4 1.1 .9 1.2 1.4 .7 1.0 1.4 1.9 1.5 2.2 2.5
3.7 3.2 2.5 2.2 1.5 1.6 1.6 1.0 1.2 2.5 2.6 2.5 2.2 2.5 2.6 2.4 2.8 3.3 3.7 3.3 3.4 2.0 1.3 1.0 .9 2.0 3.2 3.3 3.0 2.8 3.0 2.8 4.2 3.6 3.8 5.3
3.3 2.7 1.4 1.3 1.2 .9 .4 .5 .5 1.3 4.6 4.6 4.3 4.6 3.5 2.6 1.8 2.5 3.2 3.8 4.6 3.5 2.1 2.6 2.9 3.3 3.8 4.0 4.5 4.1 4.3 4.5 4.3 4.1 4.1 4.4
2.8 2.9 3.7 2.9 3.1 1.6 .9 .6 .5 .5 3.1 4.3 3.9 2.8 1.7 .9 .5 .7 1.2 3.9 4.4 4.3 4.0 3.2 3.8 4.3 2.7 3.1 2.4 2.3 4.3 3.6 3.7 2.4 2.1 3.5
1.8 1.2 1.9 2.0 3.1 2.6 1.5 .9 .6 .5 .5 2.2 3.2 2.2 .9 1.3 .7 .5 .5 2.1 2.2 1.9 2.1 1.9 1.9 1.1 1.6 1.8 1.3 1.2 2.3 1.9 1.9 1.7 1.4 1.6
2.4 1.6 1.5 1.6 1.8 2.3 1.8 .8 .6 .6 .6 2.1 2.6 2.3 1.7 1.2 1.1 1.1 .7 .6 1.4 1.4 1.4 1.1 1.3 1.2 1.1 .9 .8 .9 1.5 1.7 1.4 1.7 1.5 1.4
1.3 1.4 1.3 1.3 1.3 1.4 1.4 1.2 1.0 .8 1.8 1.4 1.3 1.3 1.6 1.8 1.5 1.4 1.2 1.0 1.0 1.3 1.4 1.4 1.4 1.2 1.2 1.2 .9 1.1 1.1 1.2 1.1 1.3 1.3 1.2
.9 1.0 1.1 1.1 1.0 1.0 1.0 .9 1.1 1.1 1.1 1.3 1.0 1.0 1.0 1.1 .9 .7 .9 1.1 .9 1.1 1.2 1.0 1.1 1.2 1.2 1.3 1.1 1.1 1.2 1.0 1.0 1.2 1.1 1.1
.7 .7 .9 .9 .7 .7 .6 .5 .5 .7 .7 1.0 .9 .8 .9 .7 .7 .7 .7 .7 .7 .6 .7 .6 .7 .6 .7 .8 .9 1.0 1.0 1.0 .9 .8 .8 .7
.4 .4 .4 .4 .5 .4 .4 .4 .5 .5 .6 .7 .5 .5 .5 .7 1.0 1.2 1.0 .8 .6 .5 .4 .4 .4 .5 .5 .5 .5 .6 .5 .4 .4 .4 .5 .4
.4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .5 .5 .5 .5 .5 .5 .6 .8 .8 .7 .6 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .5 .4

Figure 64. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

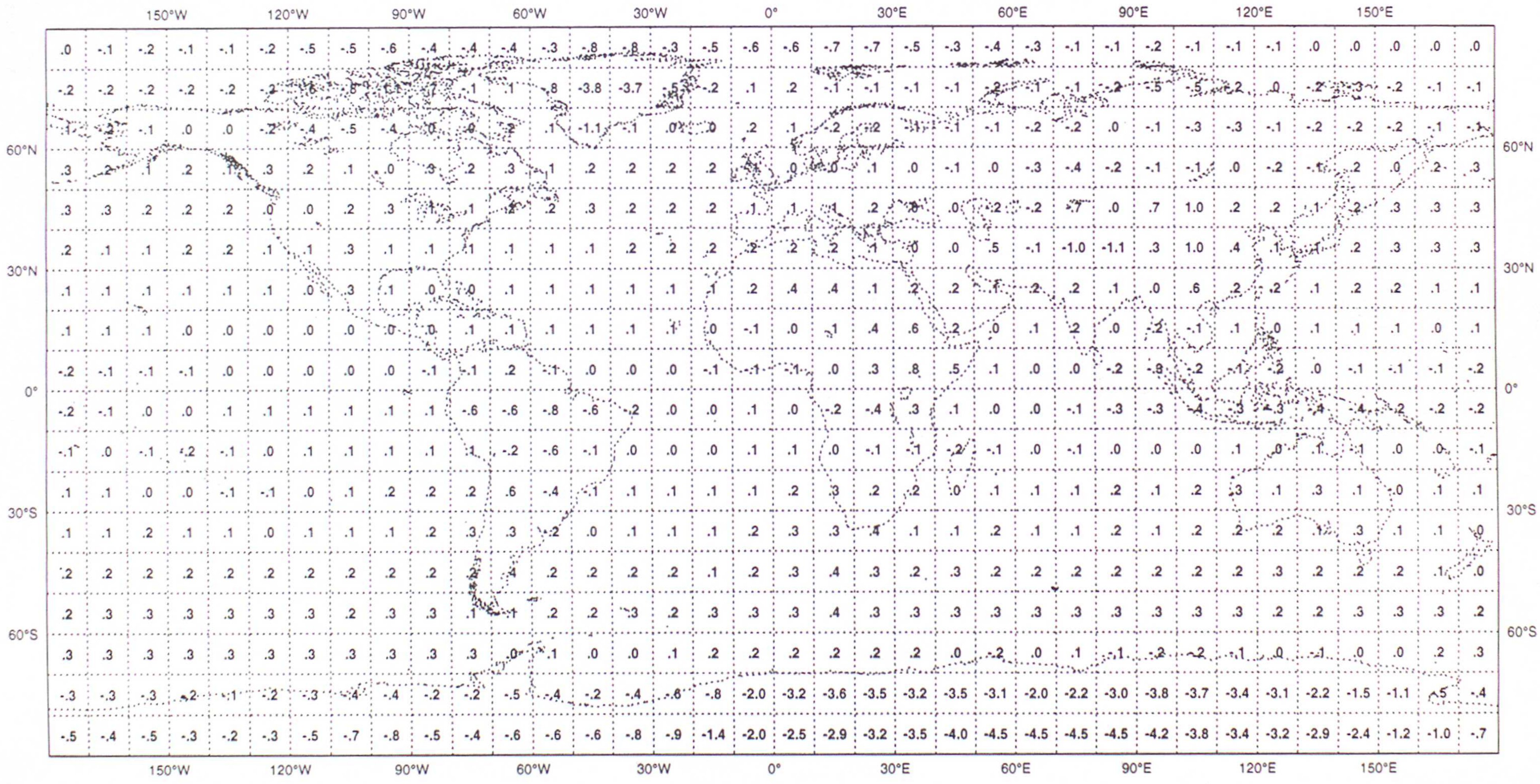

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 65. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

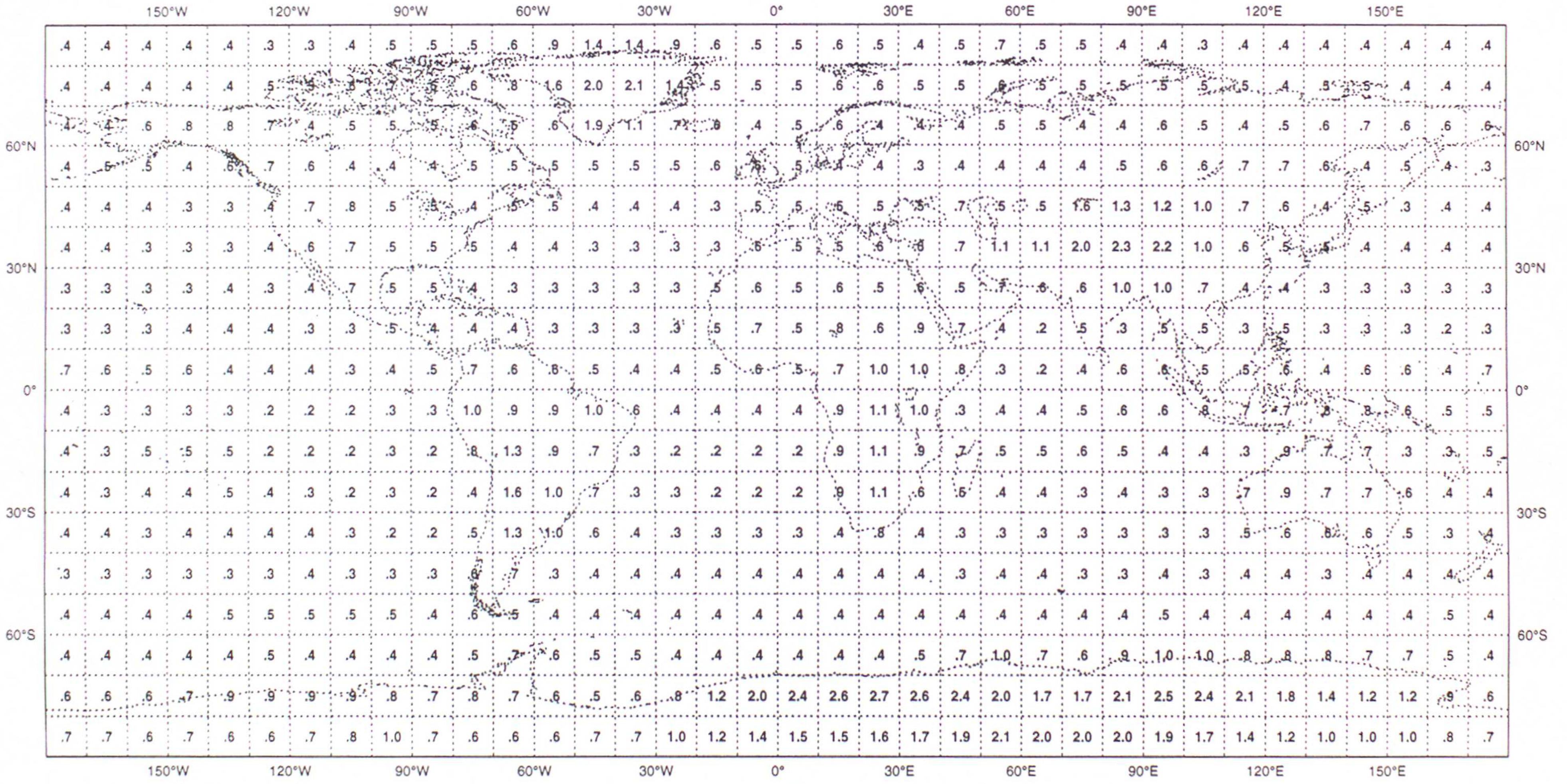

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.4 .4 .4 .4 .4 .3 .3 .4 .5 .5 .5 .6 .9 1.4 1.4 .9 .6 .5 .5 .6 .5 .4 .5 .7 .5 .5 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .5 .5 .5 .7 .5 .6 .8 1.6 2.0 2.1 1.4 .5 .5 .5 .6 .6 .5 .5 .6 .5 .5 .5 .5 .5 .5 .4 .5 .5 .4 .4 .4
.4 .4 .6 .8 .8 .7 .4 .5 .5 .5 .6 .5 .6 1.9 1.1 .7 .8 .4 .5 .6 .4 .4 .4 .5 .5 .4 .4 .6 .5 .4 .5 .6 .7 .6 .6 .6
.4 .5 .5 .4 .6 .7 .6 .4 .4 .4 .5 .5 .5 .5 .5 .5 .6 .5 .5 .4 .4 .3 .4 .4 .4 .4 .5 .6 .6 .7 .7 .6 .4 .5 .4 .3
.4 .4 .4 .3 .3 .4 .7 .8 .5 .5 .4 .5 .5 .4 .4 .4 .3 .5 .5 .6 .5 .5 .7 .5 .5 1.6 1.3 1.2 1.0 .7 .6 .4 .5 .3 .4 .4
.4 .4 .3 .3 .3 .4 .6 .7 .5 .5 .5 .4 .4 .3 .3 .3 .3 .6 .5 .5 .6 .6 .7 1.1 1.1 2.0 2.3 2.2 1.0 .6 .5 .5 .4 .4 .4 .4
.3 .3 .3 .3 .4 .3 .4 .7 .5 .5 .4 .3 .3 .3 .3 .3 .5 .6 .5 .6 .5 .6 .5 .7 .6 .6 1.0 1.0 .7 .4 .4 .3 .3 .3 .3 .3
.3 .3 .3 .4 .4 .4 .3 .3 .5 .4 .4 .4 .3 .3 .3 .3 .5 .7 .5 .8 .6 .9 .7 .4 .2 .5 .3 .5 .5 .3 .5 .3 .3 .3 .2 .3
.7 .6 .5 .6 .4 .4 .4 .3 .4 .5 .7 .6 .8 .5 .4 .4 .5 .6 .5 .7 1.0 1.0 .8 .3 .2 .4 .6 .6 .5 .5 .6 .4 .6 .6 .4 .7
.4 .3 .3 .3 .3 .2 .2 .2 .3 .3 1.0 .9 .9 1.0 .6 .4 .4 .4 .4 .9 1.1 1.0 .3 .4 .4 .5 .6 .6 .8 .7 .7 .8 .8 .6 .5 .5
.4 .3 .5 .5 .5 .2 .2 .2 .3 .2 .8 1.3 .9 .7 .3 .2 .2 .2 .2 .9 1.1 .9 .7 .5 .5 .6 .5 .4 .4 .3 .9 .7 .7 .3 .3 .5
.4 .3 .4 .4 .5 .4 .3 .2 .3 .2 .4 1.6 1.0 .7 .3 .3 .2 .2 .2 .9 1.1 .6 .5 .4 .4 .3 .4 .3 .3 .7 .9 .7 .7 .6 .4 .4
.4 .4 .3 .4 .4 .4 .4 .3 .2 .2 .5 1.3 1.0 .6 .4 .3 .3 .3 .3 .4 .8 .4 .3 .3 .3 .3 .3 .3 .3 .5 .6 .6 .6 .5 .3 .4
.3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .6 .7 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .3 .4 .3 .4 .4 .3 .4 .4 .4 .4
.4 .4 .4 .4 .5 .5 .5 .5 .5 .4 .6 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .5 .4
.4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .7 .6 .5 .5 .4 .4 .4 .4 .4 .4 .5 .7 1.0 .7 .6 .9 1.0 1.0 .8 .8 .8 .7 .7 .5 .4
.6 .6 .6 .7 .9 .9 .9 .9 .8 .7 .8 .7 .6 .5 .6 .8 1.2 2.0 2.4 2.6 2.7 2.6 2.4 2.0 1.7 1.7 2.1 2.5 2.4 2.1 1.8 1.4 1.2 1.2 .9 .6
.7 .7 .6 .7 .6 .6 .7 .8 1.0 .7 .6 .6 .6 .7 .7 1.0 1.2 1.4 1.5 1.5 1.6 1.7 1.9 2.1 2.0 2.0 2.0 1.9 1.7 1.4 1.2 1.0 1.0 1.0 .8 .7

Figure 66. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

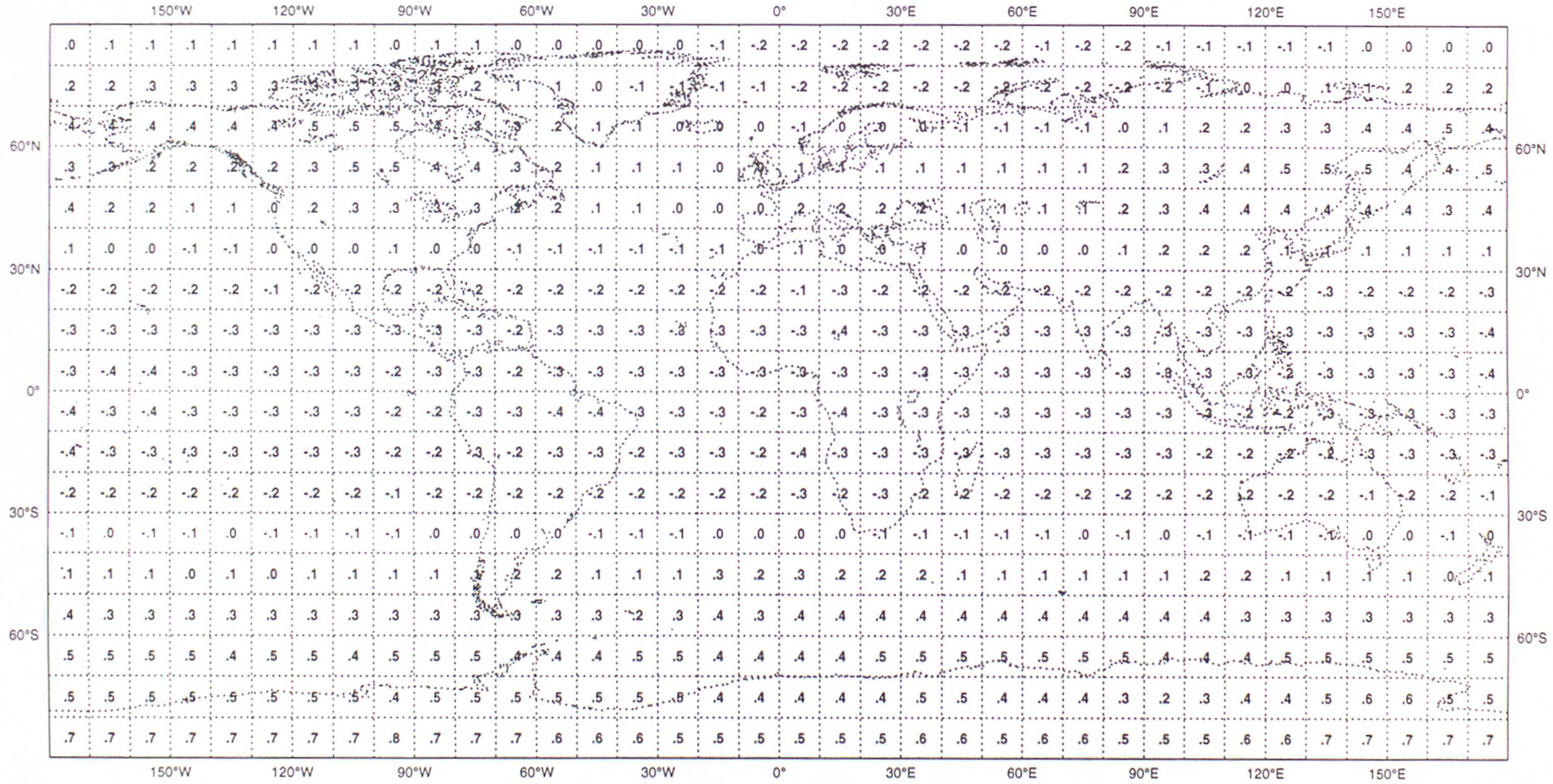

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.0 .1 .1 .1 .1 .1 .1 .1 .0 .1 .1 .0 .0 .0 .0 .0 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.1 -.1 -.1 -.1 -.1 .0 .0 .0 .0
.2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .2 .1 .1 .0 -.1 -.1 -.1 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 .0 .0 .1 .1 .2 .2 .2
.4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .3 .3 .2 .1 .1 .0 .0 .0 -.1 .0 .0 .0 -.1 -.1 -.1 -.1 .0 .1 .2 .2 .3 .3 .4 .4 .5 .4
.3 .3 .2 .2 .2 .2 .3 .5 .5 .4 .4 .3 .2 .1 .1 .1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .1 .2 .3 .3 .4 .5 .5 .5 .4 .4 .5
.4 .2 .2 .1 .1 .0 .2 .3 .3 .3 .3 .2 .2 .1 .1 .0 .0 .0 .2 .2 .2 .2 .1 .1 .1 .1 .2 .3 .4 .4 .4 .4 .4 .4 .3 .4
.1 .0 .0 -.1 -.1 .0 .0 .0 .1 .0 .0 -.1 -.1 -.1 -.1 -.1 -.1 .0 .1 .0 .0 .1 .0 .0 .0 .0 .1 .2 .2 .2 .1 .1 .1 .1 .1 .1
-.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.3
-.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.4
-.3 -.4 -.4 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.3 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.8 -.3 -.3 -.2 -.3 -.3 -.3 -.3 -.4
-.4 -.3 -.4 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.3 -.3 -.4 -.4 -.3 -.3 -.3 -.2 -.3 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.3 -.3 -.3 -.3 -.3
-.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.3 -.2 -.3 -.3 -.2 -.3 -.3 -.2 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.2 -.3 -.3 -.3 -.3
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.1
-.1 .0 -.1 -.1 .0 -.1 -.1 -.1 -.1 .0 .0 .0 .0 -.1 -.1 -.1 .0 .0 .0 .0 -.1 -.1 -.1 -.1 -.1 .0 -.1 .0 -.1 -.1 -.1 -.1 .0 .0 -.1 .0
.1 .1 .1 .0 .1 .0 .1 .1 .1 .1 .1 .2 .2 .1 .1 .1 .3 .2 .3 .2 .2 .2 .1 .1 .1 .1 .1 .1 .2 .2 .1 .1 .1 .1 .0 .1
.4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3
.5 .5 .5 .5 .4 .5 .5 .4 .5 .5 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .6 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .3 .2 .3 .4 .4 .5 .6 .6 .5 .5
.7 .7 .7 .7 .7 .7 .7 .7 .8 .7 .7 .7 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .5 .6 .6 .5 .5 .5 .6 .6 .7 .7 .7 .7 .7

Figure 67. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

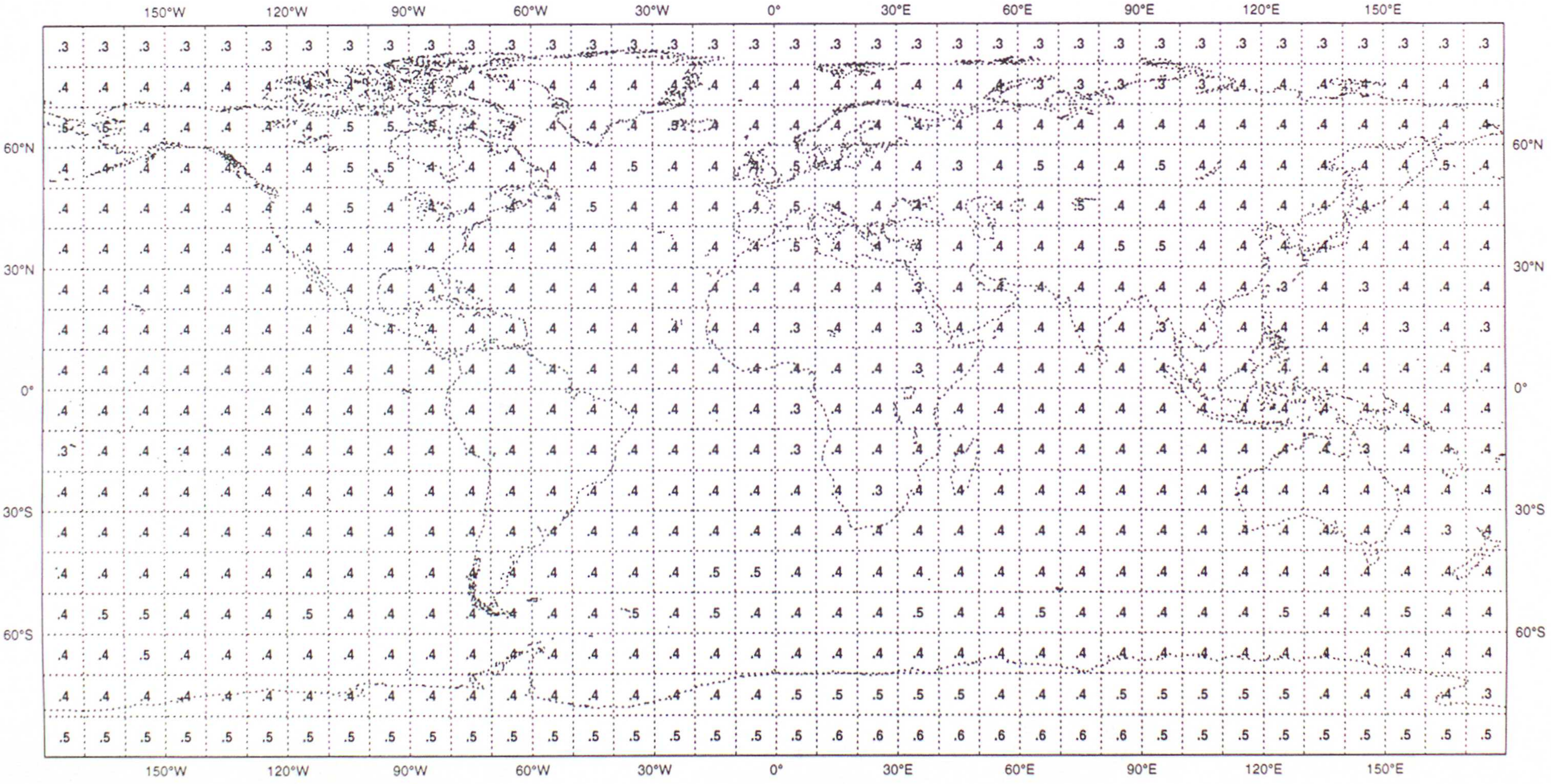

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 68. ATOVS MEAN O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

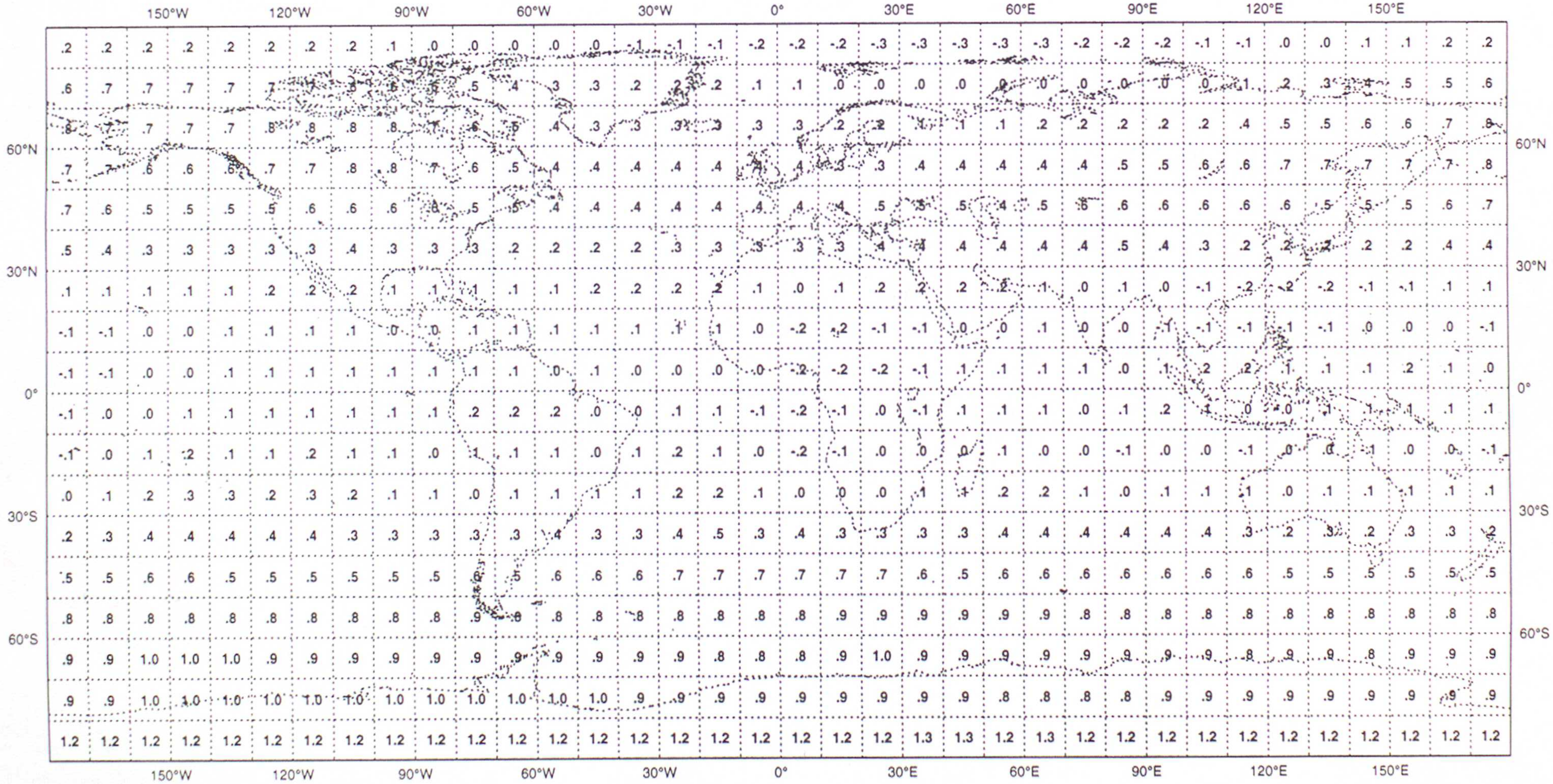

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .2 .2 .2 .2 .2 .2 .1 .0 .0 .0 .0 .0 -.1 -.1 -.1 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.1 -.1 .0 .0 .1 .1 .2 .2
.6 .7 .7 .7 .7 .7 .7 .6 .6 .6 .5 .4 .3 .3 .2 .2 .2 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .2 .3 .4 .5 .5 .6
.8 .7 .7 .7 .7 .8 .8 .8 .8 .7 .6 .5 .4 .3 .3 .3 .3 .3 .3 .2 .2 .1 .1 .1 .2 .2 .2 .2 .2 .4 .5 .5 .6 .6 .7 .8
.7 .7 .6 .6 .6 .7 .7 .8 .8 .7 .6 .5 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .5 .5 .6 .6 .7 .7 .7 .7 .7 .8
.7 .6 .5 .5 .5 .5 .6 .6 .6 .6 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .5 .6 .6 .6 .6 .6 .6 .5 .5 .5 .6 .7
.5 .4 .3 .3 .3 .3 .3 .4 .3 .3 .3 .2 .2 .2 .2 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .5 .4 .3 .2 .2 .2 .2 .2 .4 .4
.1 .1 .1 .1 .1 .2 .2 .2 .1 .1 .1 .1 .1 .2 .2 .2 .2 .1 .0 .1 .2 .2 .2 .2 .1 .0 .1 .0 -.1 -.2 -.2 -.2 -.1 -.1 .1 .1
-.1 -.1 .0 .0 .1 .1 .1 .1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .0 -.2 -.2 -.1 -.1 .0 .0 .1 .0 .0 -.1 -.1 -.1 -.1 -.1 .0 .0 .0 -.1
-.1 -.1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .1 .0 .1 .0 .0 .0 .0 -.2 -.2 -.2 -.1 .1 .1 .1 .1 .0 .1 .2 .2 .1 .1 .1 .2 .1 .0
-.1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .2 .2 .2 .0 .0 .1 .1 -.1 -.2 -.1 .0 -.1 .1 .1 .1 .0 .1 .2 .1 .0 .0 .1 .1 .1 .1 .1
-.1 .0 .1 .2 .1 .1 .2 .1 .1 .0 .1 .1 .1 .0 .1 .2 .1 .0 -.2 -.1 .0 .0 .0 .1 .0 .0 -.1 .0 .0 -.1 .0 .0 -.1 .0 .0 -.1
.0 .1 .2 .3 .3 .2 .3 .2 .1 .1 .0 .1 .1 .1 .1 .2 .2 .1 .0 .0 .0 .1 .1 .2 .2 .1 .0 .1 .1 .1 .0 .1 .1 .1 .1 .1
.2 .3 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .3 .3 .4 .5 .3 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .2 .3 .2 .3 .3 .2
.5 .5 .6 .6 .5 .5 .5 .5 .5 .5 .6 .5 .6 .6 .6 .7 .7 .7 .7 .7 .7 .6 .5 .6 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5
.8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
.9 .9 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .8 .8 .8 .9 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .8 .9 .9 .8 .9 .9 .9
.9 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9
1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.3 1.3 1.2 1.3 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2

Figure 69. ATOVS SD O-B brightness temperature differences (deg C). FEBRUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

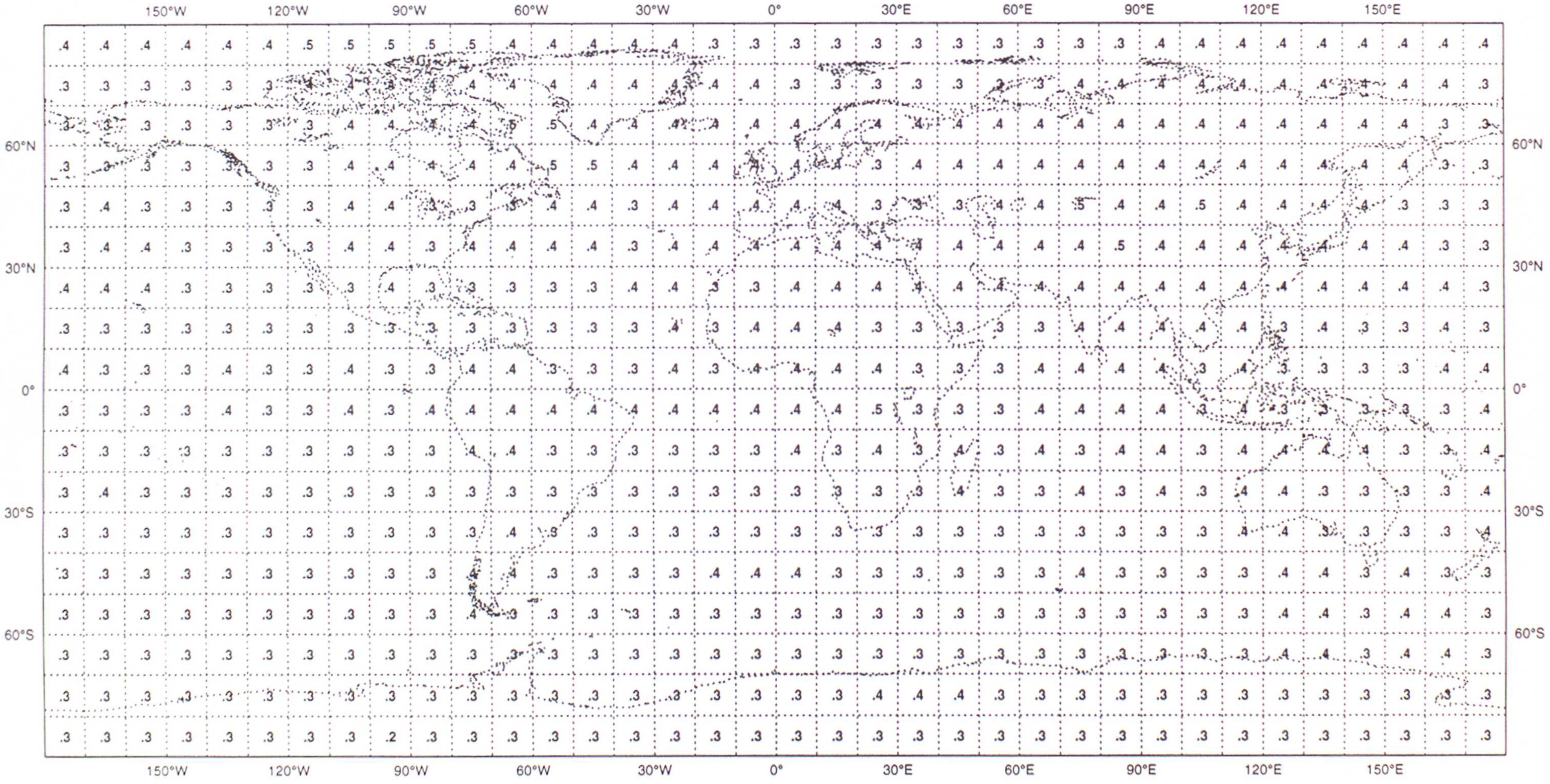

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoy.
Area monitored		:10°N - 80°N, 85°W - 0°W
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:All hours combined.
Elements monitored		:Mean sea-level pressure (hPa) :Wind speed (m s^{-1}) :Wind direction (degrees)
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. A positive bias indicates the wind observation is veered to the background**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors
GROSS ERROR LIMITS	:15 hPa (pressure) :25 m s^{-1} (Vector Wind)	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
30717	46.7	-48.7	P	2	0	0	0.1	-1.0	1.0
41503	15.3	-59.4	P	440	0	2	0.8	-1.1	1.4
41522	19.7	-54.5	P	500	0	2	0.6	-0.7	0.9
41531	23.3	-68.2	P	503	0	1	0.5	0.2	0.5
41532	23.3	-73.5	P	636	0	23	0.5	0.3	0.6
41533	30.4	-74.9	P	349	0	0	0.6	-2.0	2.1
41534	25.9	-66.9	P	527	0	2	0.5	0.2	0.5
41537	24.7	-67.4	P	512	0	3	0.5	0.3	0.5
41640	39.6	-33.0	P	543	0	100	0.9	2.2	2.4
41648	25.8	-70.9	P	557	0	3	0.6	-0.6	0.8
41649	16.9	-59.4	P	477	0	3	0.7	-1.8	1.9
41658	43.7	-33.1	P	420	1	6	1.9	-0.8	2.1
41659	31.3	-29.3	P	544	0	1	0.5	0.4	0.6
41666	35.8	-51.4	P	803	0	34	0.8	0.0	0.8
44549	60.6	-16.3	P	1	100	100			
44550	60.2	-8.6	P	812	0	45	1.1	-0.6	1.2
44585	42.3	-68.8	P	219	0	22	2.1	0.9	2.3
44601	32.4	-42.2	P	550	0	1	0.7	-0.5	0.8
44603	56.3	-35.9	P	522	1	1	1.4	-0.1	1.4
44606	29.7	-53.3	P	630	0	0	0.7	0.2	0.7
44608	36.9	-34.0	P	613	0	1	0.9	0.4	1.0
44609	51.0	-26.0	P	605	0	1	1.3	-0.5	1.4
44610	42.6	-40.5	P	935	1	36	1.9	0.4	1.9
44611	53.1	-29.9	P	1127	0	46	1.6	-0.2	1.6
44612	53.0	-42.6	P	384	1	3	2.1	0.2	2.1
44613	51.5	-37.4	P	599	2	5	2.2	0.1	2.2
44614	60.0	-34.0	P	873	1	36	2.3	0.4	2.3
44616	37.7	-11.4	P	937	0	36	0.7	-0.4	0.8
44627	33.8	-16.2	P	563	0	0	0.6	-0.7	0.9
44721	34.2	-35.1	P	625	0	0	0.6	-0.3	0.7
44723	42.9	-15.8	P	956	0	38	1.0	0.4	1.0
44726	63.1	-34.0	P	1309	0	53	1.5	0.0	1.5
44730	52.6	-39.8	P	623	0	68	1.5	-0.1	1.5
44763	39.0	-10.8	P	610	0	0	0.6	0.2	0.6
44764	55.3	-22.1	P	1285	0	55	2.1	0.2	2.1
44767	54.3	-12.4	P	1008	0	41	1.1	0.0	1.1
44768	46.6	-32.5	P	564	0	33	1.1	0.8	1.4
44769	61.2	-31.2	P	1449	0	60	1.7	-1.0	2.0
44773	44.1	-20.0	P	557	0	3	1.4	0.5	1.5
44774	46.1	-24.7	P	194	0	13	1.1	-0.3	1.1
44776	47.4	-32.4	P	289	0	71	2.0	-0.3	2.0
44780	64.0	-25.1	P	478	0	39	1.6	-0.4	1.7
47554	73.1	-76.2	P	392	0	27	0.9	0.2	0.9
48589	73.3	-19.5	P	192	0	0	1.1	0.4	1.2
49924	62.0	-5.7	P	1	0	0	0.0	-1.0	1.0
62501	30.8	-37.1	P	619	0	1	0.5	0.6	0.8
62503	32.2	-39.3	P	620	0	0	0.5	-0.8	0.9
62505	58.3	-19.1	P	1295	0	52	1.7	-0.5	1.7
62508	44.1	-6.4	P	610	0	0	0.7	-0.5	0.9
62512	38.3	-9.3	P	730	0	23	1.2	0.2	1.2
62513	37.1	-29.0	P	604	0	0	0.8	0.3	0.8
62514	34.6	-23.4	P	598	0	1	0.9	0.1	0.9
62515	29.9	-23.9	P	624	0	0	0.5	0.1	0.5
62517	35.2	-23.7	P	754	0	21	1.0	-0.2	1.0
62519	45.5	-3.5	P	573	0	1	1.0	-0.2	1.0
62599	50.6	-20.3	P	248	0	16	1.3	-0.2	1.3
62600	47.7	-20.2	P	203	0	14	1.1	-0.5	1.2
62696	59.3	-22.9	P	1091	1	48	2.2	-0.1	2.2
62711	60.3	-54.9	P	950	0	41	1.2	0.4	1.3
62712	62.3	-34.9	P	1253	0	50	1.4	0.0	1.4

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
62713	52.5	-21.8	P	204	1	9	2.2	1.2	2.5
62714	47.1	-33.4	P	453	1	6	2.0	1.0	2.2
64522	65.1	-28.5	P	535	0	1	1.5	0.4	1.6
WIND SPEED									
30717	46.7	-48.7	SPEED	2	0	100	0.7	6.3	6.3
41503	15.3	-59.4	SPEED	437	0	100	1.4	-0.2	1.4
41522	19.7	-54.5	SPEED	500	0	100	1.5	0.6	1.6
41531	23.3	-68.2	SPEED	500	0	100	1.7	-1.0	1.9
41532	23.3	-73.5	SPEED	630	0	100	2.2	0.2	2.2
41533	30.4	-74.9	SPEED	345	0	100	2.3	0.6	2.4
41534	25.9	-66.9	SPEED	526	0	100	1.8	-0.2	1.8
41537	24.7	-67.4	SPEED	512	0	100	1.6	-0.6	1.7
41648	25.8	-70.9	SPEED	554	0	100	1.8	0.9	2.0
41649	16.9	-59.4	SPEED	419	0	100	1.6	0.2	1.6
44601	32.4	-42.2	SPEED	548	0	100	2.2	-1.3	2.6
44602	47.0	-34.6	SPEED	220	14	100	7.7	-0.4	7.7
49924	62.0	-5.7	SPEED	1	0	100	0.0	-4.9	4.9
62711	60.3	-54.9	SPEED	943	0	100	3.0	1.2	3.2
WIND DIRECTION									
30717	46.7	-48.7	DIRN.	2	0	0	4.0	10.4	11.1
41503	15.3	-59.4	DIRN.	406	0	0	10.3	-6.5	12.2
41522	19.7	-54.5	DIRN.	464	0	0	13.2	-8.8	15.9
41531	23.3	-68.2	DIRN.	244	0	0	16.3	18.3	24.5
41532	23.3	-73.5	DIRN.	384	0	0	18.9	16.6	25.1
41533	30.4	-74.9	DIRN.	195	0	0	22.7	-6.5	23.6
41534	25.9	-66.9	DIRN.	256	0	0	27.7	7.3	28.6
41537	24.7	-67.4	DIRN.	273	0	0	20.8	-16.9	26.8
41648	25.8	-70.9	DIRN.	280	1	0	22.1	55.9	60.1
41649	16.9	-59.4	DIRN.	380	0	0	13.7	-11.6	18.0
44601	32.4	-42.2	DIRN.	275	0	0	12.7	1.7	12.8
44602	47.0	-34.6	DIRN.	179	17	0	47.2	15.4	49.6
49924	62.0	-5.7	DIRN.	1	0	0	0.0	3.5	3.5
62711	60.3	-54.9	DIRN.	827	0	0	31.2	1.6	31.3

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures:

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :40°N - 70°N, 60°W - 0°W.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored :N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	357	1	8	1.4	0.2	280	1	10	0	9.3	0.3
ACA	938	0	3	1.7	-0.3	895	0	3	0	7.3	0.3
AEA	89	0	3	1.8	0.5	37	0	0	0	6.7	-0.5
AEL	511	1	12	1.7	-0.1	381	1	14	0	8.8	0.0
AFL	200	0	6	1.8	0.3	190	1	6	0	9.0	0.0
AFR	894	1	9	1.6	0.3	700	1	12	0	8.4	0.2
AIS	219	0	9	1.5	-0.3	167	1	15	0	10.6	0.8
AJM	219	1	3	1.6	-0.1	193	0	3	0	7.8	0.8
AMM	67	0	3	1.7	0.5	42	0	5	0	11.1	0.2
AMT	22	0	5	2.3	0.4	21	0	10	0	14.0	-0.9
AMX	154	3	7	1.7	0.0	103	0	9	0	10.4	-0.4
AZA	294	1	10	2.2	0.1	266	1	7	0	9.5	0.0
BAL	94	0	12	1.9	-0.3	77	1	14	0	8.1	0.7
BAW	482	1	5	1.9	-0.5	468	0	3	0	7.0	0.2
BPA	82	11	33	3.8	1.2	67	3	16	0	9.3	-0.7
BWA	92	0	8	2.3	0.1	62	0	3	0	9.7	0.1
CFG	470	1	4	1.7	-0.8	384	1	4	0	7.1	0.0
CGA	108	0	0	1.2	0.0	108	0	0	0	4.9	0.0
CGF	65	0	2	1.5	-0.7	65	0	2	0	4.9	0.9
CGH	113	0	1	1.1	-0.1	113	0	1	0	4.9	0.7
CKS	34	15	18	1.5	-0.8	35	0	6	0	5.9	1.3
CLX	237	0	2	1.8	-0.5	224	0	4	0	7.4	0.1
COA	130	0	20	1.4	-0.2	89	0	21	0	7.9	1.6
CRL	289	1	4	1.9	0.7	190	0	5	0	9.4	0.3
CUB	111	0	44	1.6	0.9	76	1	9	0	13.9	-1.2
DAB	190	0	7	1.5	-0.2	187	0	7	0	5.5	-0.1
DAI	247	0	5	1.4	0.5	247	0	5	0	5.0	0.4
DAL	680	0	15	1.8	-0.7	638	0	17	0	8.5	0.0
DBR	42	0	5	1.6	0.0	42	2	5	0	6.7	-0.2
DCE	81	1	10	1.2	0.0	69	0	12	0	8.9	-0.2
DCS	22	0	14	2.6	-1.0	22	0	14	0	11.7	1.2
DHL	59	0	100	6.4	-6.0	57	0	93	0	13.4	3.1
DLH	715	1	13	1.8	0.1	714	1	13	0	7.1	0.7
EDW	37	0	3	1.6	-0.3	34	0	3	0	5.8	1.6
EEZ	30	10	17	1.6	-0.1	30	0	17	0	9.2	-0.7
EIA	195	5	100	3.3	1.6	186	1	100	0	19.6	5.4
ELY	97	0	3	2.0	-0.1	91	0	2	0	6.1	0.9
ETH	24	0	8	1.1	0.7	20	0	10	0	5.1	-0.1
FDX	603	1	28	1.6	0.1	607	0	28	0	8.0	0.6
FGS	145	0	1	1.5	0.3	144	0	1	0	4.6	0.6
FGZ	71	0	0	1.3	-0.2	70	0	0	0	4.9	0.5
FIN	153	1	6	1.6	0.1	149	1	5	0	7.3	-0.2
GCO	338	1	9	1.8	0.1	339	0	13	0	11.1	1.8
GRL	69	0	3	1.8	-0.3	66	0	3	0	5.4	0.1
GTI	254	1	14	2.0	0.2	240	0	17	0	11.3	0.1
GVA	35	0	0	1.2	0.2	35	0	0	0	5.9	0.4
GVF	32	0	0	1.4	-0.4	32	0	0	0	5.2	-0.6
GVG	45	0	0	1.3	-0.1	45	0	0	0	5.7	-0.4
GVH	29	0	3	1.5	-0.1	29	0	3	0	4.1	0.4
GVL	36	0	0	1.2	-0.2	36	0	0	0	5.5	-0.3
GVR	101	0	1	1.2	0.0	101	0	2	0	6.0	0.4
GVT	25	0	4	1.8	-0.5	25	0	0	0	5.9	0.6
GVW	28	0	4	1.3	-0.8	28	0	4	0	4.4	-0.4
GVX	30	0	0	1.2	0.0	29	0	0	0	3.8	0.4
GWW	54	0	2	1.5	-0.5	54	0	2	0	5.8	2.0
HMY	21	0	0	1.7	-1.2	20	0	0	0	6.5	1.5
IBE	860	0	5	1.7	0.5	505	1	9	0	8.6	0.4
ICE	523	0	2	1.6	-0.1	507	0	3	0	7.3	0.5
IWD	63	2	5	1.5	-0.3	25	0	4	0	7.1	1.3

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
KLM	955	0	2	1.7	0.1	851	1	4	0	8.4	0.1
LAN	49	0	12	1.9	0.4	45	2	20	0	14.0	-1.9
LDI	266	0	4	1.5	-0.4	195	1	6	0	9.2	-0.4
LIB	39	0	0	1.3	0.9	29	0	14	0	10.4	-0.3
LOT	58	2	7	1.9	-1.3	53	0	8	0	7.2	0.2
LTU	445	1	5	1.7	-0.1	375	0	6	0	7.2	1.0
LXR	35	6	17	1.7	0.5	23	0	13	0	6.9	-0.1
MON	44	0	0	1.2	-0.3	40	0	0	0	5.0	1.4
MPD	85	4	4	1.7	0.0	44	0	5	0	8.1	0.0
MPH	295	0	1	1.8	-0.7	276	0	2	0	7.8	-0.1
MYT	139	1	5	2.1	0.4	119	2	5	0	7.8	-0.4
NCA	27	4	4	1.2	0.5	25	0	4	0	10.6	0.1
NWA	2493	1	4	1.6	0.2	2502	0	3	0	6.6	0.3
OAE	62	0	6	1.7	-0.3	59	0	56	0	18.4	7.6
PAC	247	1	9	1.7	0.0	244	1	9	0	7.2	0.5
RAM	207	1	5	1.9	0.2	125	1	64	0	10.5	0.2
RCH	443	1	80	2.2	0.1	405	1	100	0	11.5	0.6
RJA	34	6	18	1.6	-0.1	34	0	12	0	6.6	1.6
RZO	49	2	8	1.5	-0.4	41	0	10	0	8.1	0.7
SEU	86	0	5	1.6	-0.1	72	0	6	0	6.5	1.0
SLR	141	0	7	1.3	-0.2	126	1	11	0	8.2	0.2
SVA	23	0	0	1.4	0.1	28	0	4	0	4.9	0.5
TAP	200	1	7	2.0	-0.3	101	0	7	0	8.1	0.4
TSC	35	0	3	2.1	-0.1	33	0	0	0	5.4	0.3
UAL	421	0	60	2.1	-1.0	413	0	63	0	8.0	0.2
UPS	947	0	36	2.2	0.5	935	0	35	0	8.3	-0.3
USA	118	1	4	1.6	-0.2	95	0	7	0	9.1	0.6
VIR	181	0	4	2.1	-0.2	184	1	4	0	7.5	0.4
VPB	21	0	10	2.0	0.5	22	0	9	0	6.8	-0.5
WOA	352	1	12	1.8	0.1	339	1	13	0	10.3	1.0
9VS	145	0	3	1.3	-0.1	145	0	3	0	5.8	0.5
EU	25014	0	21	1.3	0.0	25014	0	21	0	5.0	0.6
KL	763	0	10	1.3	0.5	758	0	10	0	5.8	0.3
LH	340	0	10	1.8	1.2	340	0	10	0	5.1	0.3
N	1784	0	12	1.5	0.1	1771	0	11	0	5.8	0.6
US ACARS	17540	9	34	1.6	0.2	17540	0	25	0	5.9	0.4

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	100	3	0	7.3	7.7	-2.3
DBLK	12	Z	100	11	0	12.5	37.1	34.9
EBUQ	12	Z	100	12	0	14.3	32.0	28.7
ELML7	00	Z	100	1	0	0.0	12.0	12.0
ELML7	12	Z	100	4	0	18.3	28.2	21.5
FNPH	00	Z	100	4	0	25.9	35.8	-24.8
FNPH	12	Z	100	2	0	11.0	48.3	-47.0
FNRS	00	Z	100	2	0	9.5	15.7	-12.5
FNRS	12	Z	100	2	0	17.5	65.9	-63.5
LDWR	00	Z	100	25	0	15.9	26.0	-20.6
LDWR	12	Z	100	26	0	12.9	25.1	-21.5
OXTS2	00	Z	100	7	0	15.8	56.5	-54.3
OXTS2	12	Z	100	7	1	36.4	67.4	-56.7
SWJS	00	Z	100	1	0	0.0	4.0	4.0
SWJS	12	Z	100	1	2	0.0	13.0	-13.0
V2XM	00	Z	100	5	0	17.2	20.1	-10.4
V2XM	12	Z	100	7	0	13.5	19.6	-14.3
WPKD	00	Z	100	8	1	11.8	23.6	-20.5
WPKD	12	Z	100	3	1	9.0	16.1	-13.3
ZCBP6	00	Z	100	5	0	8.9	9.1	-1.8
ZCBP6	12	Z	100	6	0	10.9	15.6	11.2
03953	00	Z	100	26	0	15.1	16.8	-7.3
03953	12	Z	100	25	0	19.7	21.8	-9.4
04018	00	Z	100	21	0	13.3	25.8	-22.0
04018	12	Z	100	22	0	17.8	26.3	-19.4
04220	00	Z	100	25	0	13.7	29.6	-26.3
04220	12	Z	100	27	0	13.5	30.1	-26.9
04270	00	Z	100	24	0	9.3	22.9	-20.9
04270	12	Z	100	25	0	15.2	27.7	-23.1
04339	00	Z	100	26	0	21.5	32.7	-24.6
04339	12	Z	100	26	0	10.6	26.0	-23.8
04360	00	Z	100	26	0	11.5	32.1	-30.0
04360	12	Z	100	25	0	12.0	33.3	-31.1
08001	00	Z	100	21	0	20.7	24.4	-12.9
08001	12	Z	100	21	0	18.8	23.2	-13.6
08508	12	Z	100	25	0	19.0	25.4	16.8
08522	00	Z	100	2	0	7.5	19.0	17.5
08522	12	Z	100	25	0	15.6	28.8	24.2
08594	12	Z	100	18	0	49.3	53.0	19.5
71600	00	Z	100	24	0	19.9	33.4	-26.8
71600	12	Z	100	26	0	15.7	30.2	-25.8
72201	00	Z	100	26	0	23.2	25.4	-10.3
72201	12	Z	100	25	0	24.1	26.4	-10.9
72402	00	Z	100	25	1	11.6	11.6	0.7
72402	12	Z	100	24	0	26.7	26.7	-0.9
74494	00	Z	100	19	0	13.3	14.2	-5.1
74494	12	Z	100	21	0	14.5	25.0	-20.3
78016	00	Z	100	23	0	10.6	28.4	26.4
78016	12	Z	100	23	0	22.9	36.9	28.9

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures:

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :GEOPOTENTIAL HEIGHT in metres

Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	500	3	0	1.7	5.0	-4.7
DBLK	12	Z	500	11	0	7.9	9.7	5.5
EBUQ	12	Z	500	13	0	9.8	14.6	10.9
ELML7	00	Z	500	1	0	0.0	4.0	4.0
ELML7	12	Z	500	6	0	7.8	8.7	3.8
FNPH	00	Z	500	7	0	10.6	21.1	-18.3
FNPH	12	Z	500	4	0	11.5	14.3	-8.5
FNRS	00	Z	500	4	0	2.5	11.0	-10.8
FNRS	12	Z	500	4	0	14.0	18.6	-12.3
LDWR	00	Z	500	26	0	10.5	10.9	-2.8
LDWR	12	Z	500	26	0	9.2	10.7	-5.3
OXTS2	00	Z	500	7	0	8.3	19.0	-17.1
OXTS2	12	Z	500	7	1	34.0	43.9	-27.7
SWJS	00	Z	500	1	0	0.0	7.0	-7.0
SWJS	12	Z	500	1	2	0.0	4.0	4.0
V2XM	00	Z	500	6	0	16.6	17.7	6.2
V2XM	12	Z	500	8	0	23.7	24.1	-4.6
WPKD	00	Z	500	9	1	7.6	10.8	-7.8
WPKD	12	Z	500	4	1	5.2	6.4	-3.8
ZCBP6	00	Z	500	5	0	23.4	23.6	3.2
ZCBP6	12	Z	500	6	0	12.5	26.9	23.8
03953	00	Z	500	26	0	8.8	8.8	-0.3
03953	12	Z	500	26	0	19.5	19.5	-0.1
04018	00	Z	500	21	0	11.7	12.6	4.8
04018	12	Z	500	22	0	11.9	12.0	1.5
04220	00	Z	500	25	0	8.5	8.5	-0.1
04220	12	Z	500	27	0	8.3	8.4	-0.9
04270	00	Z	500	25	0	10.2	10.3	-1.6
04270	12	Z	500	27	0	9.1	9.1	0.8
04339	00	Z	500	26	0	15.0	15.4	-3.2
04339	12	Z	500	26	0	10.3	10.3	0.0
04360	00	Z	500	26	0	9.3	9.6	-2.4
04360	12	Z	500	25	0	9.1	9.2	-1.6
08001	00	Z	500	22	0	13.0	14.5	-6.4
08001	12	Z	500	24	0	10.6	11.4	-4.3
08508	12	Z	500	26	0	11.2	12.2	-4.9
08522	00	Z	500	2	0	8.0	8.0	0.0
08522	12	Z	500	26	0	7.3	8.2	3.9
08594	12	Z	500	19	0	9.7	10.2	-3.1
71600	00	Z	500	26	0	7.1	10.3	-7.5
71600	12	Z	500	26	0	15.0	18.3	-10.5
72201	00	Z	500	26	0	6.6	8.9	-5.9
72201	12	Z	500	27	0	7.8	10.9	-7.6
72402	00	Z	500	26	0	16.9	17.1	-2.6
72402	12	Z	500	25	0	11.0	11.7	-3.8
74494	00	Z	500	22	0	7.8	7.8	-0.3
74494	12	Z	500	25	0	8.4	8.6	-2.0
78016	00	Z	500	25	0	7.9	13.0	10.3
78016	12	Z	500	25	0	17.7	21.8	12.8

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	100	3	0	0	4.2	-0.9	2.7
DBLK	12	V	100	10	0	0	3.9	-0.5	-0.6
EBUQ	12	V	100	11	0	0	5.6	0.5	-0.7
ELML7	00	V	100	1	0	0	2.3	1.3	-1.9
ELML7	12	V	100	4	0	0	3.4	1.4	-1.4
FNPH	00	V	100	4	0	0	3.9	0.9	1.8
FNPH	12	V	100	3	0	0	3.5	-0.9	-0.7
FNRS	00	V	100	2	0	0	11.2	6.5	-3.3
FNRS	12	V	100	2	0	0	4.3	3.9	-1.8
LDWR	00	V	100	25	0	0	2.9	0.2	-0.2
LDWR	12	V	100	26	0	0	2.8	0.3	0.1
OXTS2	00	V	100	7	0	28	20.6	-2.0	-7.8
OXTS2	12	V	100	6	0	0	6.3	-0.8	2.3
SWJS	00	V	100	1	0	0	2.1	1.6	-1.4
SWJS	12	V	100	3	0	0	1.7	0.5	0.7
V2XM	00	V	100	3	0	0	3.1	2.2	-0.5
V2XM	12	V	100	6	0	0	3.7	2.0	-0.5
WPKD	00	V	100	8	0	0	5.1	-2.5	0.1
WPKD	12	V	100	4	0	0	4.0	-1.2	-0.5
ZCBP6	00	V	100	5	0	0	5.2	-2.5	2.8
ZCBP6	12	V	100	2	0	0	6.9	2.7	4.9
03953	00	V	100	26	0	0	3.5	1.4	0.3
03953	12	V	100	25	0	0	3.4	-0.1	1.2
04018	00	V	100	20	0	0	3.9	0.1	0.7
04018	12	V	100	21	0	0	4.1	0.2	0.6
04220	00	V	100	25	0	0	3.2	0.5	0.0
04220	12	V	100	27	0	0	2.5	-0.3	0.3
04270	00	V	100	24	0	4	6.0	-1.5	-0.5
04270	12	V	100	25	0	0	4.9	-0.4	-0.4
04339	00	V	100	23	0	21	9.4	1.2	-1.3
04339	12	V	100	26	0	3	6.1	0.4	-0.5
04360	00	V	100	25	0	0	2.9	-0.2	0.8
04360	12	V	100	25	0	0	4.1	-0.9	0.1
08001	00	V	100	21	0	0	6.2	0.3	2.5
08001	12	V	100	19	0	0	4.0	0.1	-0.9
08508	12	V	100	14	0	0	5.7	0.0	-1.5
08522	00	V	100	2	0	0	2.0	-1.8	-0.7
08522	12	V	100	13	0	0	4.9	-0.7	0.5
08594	12	V	100	17	0	100	6.3	0.8	3.6
71600	00	V	100	17	0	0	4.4	0.7	-0.2
71600	12	V	100	23	0	4	7.6	-0.3	-0.1
72201	00	V	100	26	0	0	4.3	0.3	0.7
72201	12	V	100	25	0	0	3.7	0.7	0.9
72402	00	V	100	26	0	0	5.0	1.6	-0.7
72402	12	V	100	25	0	0	5.3	0.4	-0.1
74494	00	V	100	17	0	100	5.6	-1.6	1.1
74494	12	V	100	19	0	100	4.0	-1.0	1.4
78016	00	V	100	23	0	0	5.6	0.7	-0.2
78016	12	V	100	22	0	0	7.0	1.7	-1.6

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: February 2003

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS: Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

```
 WMO   OBS              NUM    NUM      %
IDENT  TIME  ELM   LEV  OBS   GROSS    REJ     RMS     UBIAS    VBIAS

DASAP1  12    V    500    1      0       0     1.0     -1.0      0.2
DBLK    12    V    500   11      0       0     6.6      0.5     -3.0
EBUQ    12    V    500   12      0       0     4.7      0.3      1.1
ELML7   00    V    500    1      0       0     3.7     -3.6      0.7
ELML7   12    V    500    6      0       0     2.2     -1.0     -0.2

FNPH    00    V    500    7      0       0     4.3     -0.3      2.4
FNPH    12    V    500    4      0       0     2.5      0.8     -0.8
FNRS    00    V    500    4      0       0     3.5     -0.8      0.7
FNRS    12    V    500    4      0       0     3.3     -0.9      0.8
LDWR    00    V    500   26      0       0     3.8      0.0      0.4

LDWR    12    V    500   26      0       3     6.1     -1.6      0.5
OXTS2   00    V    500    6      0      16    16.2      0.3     -5.0
OXTS2   12    V    500    5      0       0     4.1      2.7     -0.5
SWJS    00    V    500    1      0       0     6.2      6.1     -1.2
SWJS    12    V    500    3      0       0     3.6      0.9     -1.2

V2XM    00    V    500    6      0       0     3.3     -1.3     -0.3
V2XM    12    V    500    7      0       0     6.0      1.9      3.4
WPKD    00    V    500    8      0       0     6.8     -0.2      2.5
WPKD    12    V    500    4      0       0     4.5      1.3     -1.5
ZCBP6   00    V    500    5      0       0     7.1     -0.4      5.1

ZCBP6   12    V    500    4      0       0     5.8     -1.1      1.3
03953   00    V    500   26      0       0     4.3      0.4      0.0
03953   12    V    500   26      0       3     6.2      1.5      0.1
04018   00    V    500   20      0       0     5.7     -1.2     -1.9
04018   12    V    500   22      0       0     5.7      0.0     -0.6

04220   00    V    500   25      0       0     3.5      0.3     -0.1
04220   12    V    500   27      0       0     5.1      0.0     -1.3
04270   00    V    500   25      0       0     5.0      0.7     -0.3
04270   12    V    500   26      0       7     8.7      3.0     -1.6
04339   00    V    500   22      0       4     8.5      1.7     -0.8

04339   12    V    500   26      0       3     7.8      0.3     -1.8
04360   00    V    500   26      0       0     7.1      0.5     -0.1
04360   12    V    500   25      0       4     6.0     -0.1      1.0
08001   00    V    500   22      0       0     5.4      0.3      0.5
08001   12    V    500   23      0       0     4.4     -0.6     -0.3

08508   12    V    500   14      0       0     4.4     -0.9      1.2
08522   00    V    500    2      0       0     4.1      0.3     -1.6
08522   12    V    500   19      0       0     3.8     -1.1      0.4
08594   12    V    500   19      0     100     4.8     -1.7      0.1
71600   00    V    500   26      0       0     4.6      0.0     -0.5

71600   12    V    500   26      0       3     7.1     -0.9      0.2
72201   00    V    500   26      0       0     3.6     -0.3      0.9
72201   12    V    500   27      0       3     4.4     -0.2     -0.6
72402   00    V    500   26      0       0     3.8      0.4     -0.5
72402   12    V    500   26      0       0     4.0      1.6      0.4

74494   00    V    500   22      0     100     4.6     -2.4      0.4
74494   12    V    500   25      0     100     4.6     -1.6      0.9
78016   00    V    500   25      0       0     4.5      0.7      0.9
78016   12    V    500   25      0       0     4.4      1.2      1.0
```

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45